

EXECUTIVE SUMMARY

Social Acceptability of New Perspectives Practices and Conditions

Final Project Report

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Prepared for: Consortium for the Social Values of Natural Resources
Cascade Center for Ecosystem Management
Olympic Natural Resources Center
USDA Forest Service, Pacific Northwest Research Station

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Introduction. The USDA Forest Service and other forest management agencies are testing silvicultural methods intended to enhance the long-term sustainability and biological diversity of forest ecosystems. In the Forest Service, these innovations have been part of an initiative called New Perspectives which seeks to develop "a scientifically sound and socially acceptable forestry of the future." This study examines the social acceptability of practices and conditions associated with New Perspectives silviculture: defining social acceptability; identifying issues and concerns that may influence acceptability among diverse publics; and testing a data visualization method that may be useful in the public participation aspects of New Perspectives. Also in this section is a discussion (pp. 4-6) of three terms that are used somewhat interchangeably: New Perspectives, new forestry, and ecosystem management.

Definitions, Dimensions, and Implications of "Social Acceptability". This chapter discusses the meaning of "social acceptability" in a forestry context. Acceptability is a term that has not been rigorously defined in social science literature, but is often used to guide management. Several of those uses are discussed here, and relevant social science literature is reviewed. Normative and transactional approaches are used to understand (1) how people judge whether something is acceptable or not, and (2) contextual influences on judgments. A basic assumption is that reality is judged in terms of its alternatives. Acceptability is seen as a function of the perceived existence, feasibility, and suitability of reality and its alternatives, as moderated by social, geographical, and risk/uncertainty considerations. The definition is summarized by eight propositions about social acceptability (pp. 25-26).

Issues and Concerns about New Perspectives Practices and Conditions. This chapter describes results of research analyzing reactions to New Perspectives silviculture by persons who encountered it on field tours, presentations, or site visits. Qualitative analysis was used to categorize issues and concerns revealed through audience questions, surveys during field tours, and interviews of recreationists. A profile of the study sample (pp. 30-35) shows that respondents were predominantly foresters, but efforts were made to gather responses from environmentalists and other interested laypersons. Analysis of audience questions (pp. 35-38) and survey responses (pp. 38-46) yielded 10 categories of issues and concerns. The most prominent concerns are about future stand growth, scientific uncertainty, economic impacts, and political implications. A list of 137 identified issues and concerns is given on pp. 48-57.

Variation in Responses to New Perspectives Silviculture. Universal acceptability is unattainable because of the wide range of views about forests held by segments of society. This chapter considers variation in reactions toward New Perspectives silviculture, focusing on four segments of society that were represented in the study sample: forest industries, forest management agencies, environmental advocacy groups, and interested forest visitors. Previous attitude research is reviewed (pp. 59-64), variation in respondent attitudes is described (pp. 64-70), and issues and concerns are re-examined to identify differences associated with particular segments of the public (pp. 70-76).

Using Data Visualization Methods to Assess Social Acceptability. Computer simulation has been proposed as a useful tool for evaluating and displaying potential impacts of New Perspectives practices in specific locations. This chapter describes a pilot study that

used a simulation process called image capture to assess scenic impacts of traditional and New Perspectives harvests at the urban/forest interface. Literature reviews discuss interface issues, data visualization methods, and backyard scenic quality (pp. 78-84). In the pilot study (pp. 84-91), residents living adjacent to a timber production forest were asked to evaluate harvest impacts based on simulated photos of their backyards after logging. Scenic impacts were judged through two measures: Likert-type ratings of acceptability, and reported willingness to pay for a series of scenic easement options. Practices were less acceptable in backyards than in an unspecified setting, and most homeowners were willing to compensate forest owners in exchange for some level of scenic protection. An assessment of the image capture technology (pp. 91-95) found that it has considerable promise for New Perspectives applications, although minor problems were found.

Conclusions and Implications for Ecosystem Managers. This chapter reviews the findings and discusses implications of the study. The eight propositions about acceptability are used to predict dimensions of the acceptability of New Perspectives silviculture (pp. 97-102). Major issues and concerns are summarized (pp. 103-106), and predictions are made about how those issues will influence acceptability judgments among the four key publics (pp. 107-113). Uses of data visualization techniques are proposed (pp. 114-115). Finally, the need for public education about New Perspectives practices and conditions is discussed, along with guidelines for the types of educational programs that may be most useful, best locations for demonstration sites, and methods for monitoring responses (pp. 115-119).

Appendices. Included with this report are a description of data-gathering sessions, sample field tour survey, list of audience questions, and interview summary.

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1. Introduction

Concern about the long-term impacts of standard forestry practice has led forest management agencies to develop and test non-traditional silvicultural techniques intended to enhance the sustainability of forest ecosystems. These new methods, known variously as "New Perspectives," "new forestry," or "ecosystem management" practices, are based on ecosystem processes and disturbance patterns specific to the locations where the methods are employed. In the past two years, research on these new innovations has been initiated on public and private forests across the United States.

Such efforts attempt to find a scientific answer to scientifically defined questions. Yet scientific concerns are only partly responsible for the pressure to change forest management in North America. Public skepticism about forestry is rooted in a wide range of social values which give rise to spiritual, aesthetic, recreational, and ethical concerns as well as biological ones. The USDA Forest Service acknowledged the social dimension of the problem in its New Perspectives sustainable forestry program, and in its recent adoption of the ecosystem management philosophy, described as "a scientifically sound and socially acceptable forestry of the future" (Salwasser 1990).

This report considers the "socially acceptable" part of Salwasser's definition. Research was undertaken to examine how new practices might affect the diverse set of values people attach to forests, focusing on the Pacific Northwest. The project grew out of a New Perspectives problem analysis conducted by Stankey and Clark (1991), who reported that "there is an inadequate understanding of what constitutes 'acceptability' with regard to the practice of New Perspectives and of the associated impacts of these differing conceptions."

Failure to understand the social context of forest management can have significant ramifications. The U.S. Congress as well as state legislatures have not hesitated to regulate public and private forests in response to constituent displeasure (Cubbage 1991, Gale 1992). Such displeasure has been increasing. As Clark and Stankey (1991) observed, the forestry profession is

"beleaguered, attacked, and criticized by commodity and amenity interests alike. Issues are often cast in good-bad terms, [which] engenders polarization and conflict while resisting accommodation, compromise, and integration."

In such a highly charged political environment, it is vital for forest policy-makers and managers to be able to gauge public reaction to their actions. As New Perspectives practices are increasingly applied for the enhancement of biological values, foresters need to be able to assess the impacts of those practices on social values as well.

It was with that need in mind that the Consortium for the Social Values of Natural Resources initiated the research project, "Social Acceptability of New Perspectives Practices and Conditions." The study focused on three key questions:

- What is meant by "social acceptability" in the context of New Perspectives?
- What are the potential impacts of New Perspectives practices and conditions which might influence judgments of social acceptability?
- How can new technologies be used to assist in evaluating short- and long-term social impacts of forestry practices that are only now being implemented?

Research on the first question required a synthesis of current conceptualizations of "acceptability" within various social sciences. Different academic disciplines bring different perspectives on public attitudes and the actions those attitudes produce. Accordingly, a multi-disciplinary literature review was undertaken. In addition, a workshop on the subject

of social acceptability was convened in June 1992 at Kelso, Wash. Participating were social scientists from several U.S. universities and Forest Service research stations representing a broad range of intellectual traditions.¹ The discussions supplemented the literature review and extended well beyond it, leading to ideas that will be integral to development of a problem analysis and proposed research program on the subject of social acceptability.² The workshop and literature review helped shape Chapter 2 of this report, which examines the definitions, dimensions, and implications of social acceptability as a forest policy goal.

Research on the second question consisted of an exploratory study to gather and categorize reactions to New Perspectives practices and conditions. The intent was to identify the range of social impacts of ecosystem management by observing how representatives of different "publics" (foresters, environmentalists, recreationists, etc.) reacted when visiting or hearing about New Perspectives demonstration sites. Observations were gathered on a series of field tours, during several public and university presentations, and from recreational visitors to a New Perspectives research site. Basic findings are provided in Chapter 3, including 137 potential impacts identified by the study. Chapter 4 considers differences in how representatives of various publics respond to New Perspectives practices and conditions.

¹Workshop participants were: Mark Brunson, Forest Resources, Oregon State Univ.; Paul Gobster, USFS North Central Forest Experiment Station, Chicago; Richard Hansis, Anthropology, Washington State Univ.-Vancouver; Linda Kruger, USFS Pacific Northwest Research Station, Seattle; Walter Kuentzel, Rural Sociology, Univ. of Wisconsin; Bernard Lewis, Forest Resources, Univ. of Minnesota; Peter List, Philosophy, Oregon State Univ.; Katrina Rogers, Political Science, Northern Arizona Univ.; George Stankey, Forest Resources, Oregon State Univ.; Kerry Vachta, Forestry, Michigan State Univ.

²The problem analysis and research agenda are to be included in a workshop proceedings, planned for publication by the Forest Service as a general technical report.

Research on the third question addressed a key methodological issue. Because "new" methods may produce previously non-existent forest conditions, it is highly desirable that today's managers anticipate (insofar as possible) the depths and directions of reaction that might occur, *before* any actual examples of those conditions exist. Computerized data visualization techniques such as image capture technology (ICT) have been proposed as solutions to this problem (Chenoweth 1992). It is important to know the capabilities and limitations of such technologies for evaluating acceptability of future forest conditions. The usefulness of ICT was assessed by evaluating results of a pilot study that used photo simulations to measure the impacts of alternative harvest practices on scenic quality of home sites adjacent to the Oregon State University research forest. A description of the study and critique of the methodology is offered in Chapter 5.

Finally, Chapter 6 synthesizes the findings and makes predictions about acceptability within different interest groups. Also included are interim guidelines for establishing New Perspectives units as public education and demonstration projects, including discussion of different tour evaluation methods, and of issues associated with the choice of a suitable demonstration site.

A note about terminology

Forest sustainability initiatives have been called by many names. It is easy to become confused when reading about "new forestry," "New Perspectives," "ecosystem management," "holistic forestry," and so on. To add to the confusion, the names are applied sometimes to specific non-traditional silvicultural practices, at other times to the conditions those practices

produce, and at still other times to an entire management philosophy. Therefore it may be useful to explain the differences between key terms, and describe their use in this report.

The best known of the various terms may be "new forestry," which appears most often in journalistic descriptions of the issues surrounding forestry (e.g., Franklin 1989; Gillis 1990). Despite its widespread use, this name is almost universally disliked among forestry professionals. That may be partly because it antagonizes well-respected traditional foresters who aren't ready to repudiate the scientific soundness of established practice, and partly cause of the name's Madison Avenue connotations. ("Get New Forestry -- now with twice the nutrient cycling power of your old brand!") It also has a fairly narrow meaning, which refers most often to silvicultural innovations that are only part of the wider sustainable forestry movement.³

The Forest Service, when it began exploring the new practices, chose to call its research program New Perspectives. The name was applied not just to silviculture, however, but to a wider vision which encompassed a stewardship philosophy, partnerships between managers and researchers and publics, and better means of achieving public participation in forest decision-making. A recent Forest Service brochure describes New Perspectives as a "renewed vision for conservation" reflecting President Bush's call for "a new kind of environmentalism, driven by the knowledge that a sound ecology and a strong economy can coexist" (USDA Forest Service 1992). Silvicultural methods associated with this vision are

³The appellation "new forestry" was first proposed at the turn of the 20th century to describe the shift toward using German plantation forestry techniques in England and the U.S. (Spies *et al.* 1991). Ironically, proponents of modern high-yield plantation forestry are the people most offended by the use of the term today.

described as "New Perspectives practices," and the forests thereby created as "New Perspectives conditions."

New Perspectives is being superseded in the Forest Service by "ecosystem management," as the agency makes the New Perspectives philosophy a central management tenet. Ecosystem management, like New Perspectives, is intended to embrace not simply a set of ecologically driven silvicultural techniques, but "a multiple-use philosophy built around ecological principles, sustainability, and a strong land stewardship ethic, with a better recognition of the spiritual values and the natural beauty of the forests" (Robertson 1991). Ecosystem management is also the term preferred by forest scientists (Spies *et al.* 1991), but as applied in the latter sense it's usually used to refer only to the biological principles used in managing forests. As of this writing, it's too soon to say how the language of forestry will evolve to distinguish between the broader and more narrow uses of this term.

This semantic confusion is reflected in the name of this study, which originated in the New Perspectives research program. Given that origin, phrases with the words "New Perspectives" will sometimes be used to describe practices and conditions. "Ecosystem management" will be generally employed when referring to the broader concept of applying state-of-the-art management tools to achieve holistic objectives. When applied in Robertson's (1991) broadest sense, the phrase "ecosystem management philosophy" will be used. The term "new forestry" will be avoided, except when referring to a survey administered on field tours. Survey items used the term New Forestry because of its widespread media acceptance, which made it potentially recognizable to a broader spectrum of publics, and because one of the tour sponsors had advertised its tours as "New Forestry field trips."

2. Definitions, Dimensions, and Implications of "Social Acceptability"

Defining social acceptability requires a synthesis of current conceptualizations within various social sciences. Relevant variables and research questions differ for every discipline that addresses acceptability-related issues in a natural resource context. For example, social psychologists may study environmental attitudes as a determinant of individual behavior, but research on environmental activism -- the link between attitudes and collective behavior -- occurs largely within political science and political sociology. Affective responses to natural environments (an important influence on attitudes) are most often studied by environmental psychologists. Other aspects of this complex issue may be studied by geographers, anthropologists, economists, or ethicists.

The word "acceptability" itself rarely appears as a rigorously defined concept in basic social science. Instead social scientists talk about "norms," "preferences," "values," "group-mediated social control," and so on. It is not clear where acceptability fits in this conceptual framework. Is an "unacceptable" condition one which violates a social norm (i.e., a widely shared standard based on a generally agreed-upon measure of the condition), or is it simply one which fails to reflect the preferences of a politically relevant segment of the public? What differences are there (if any) between what is "acceptable" and what is "desired," and what are the implications for ecosystem managers who must try to direct forests toward a "desired future condition"? By *whom* must a forest practice or condition be considered acceptable? Finding answers for these questions requires an examination of several concepts in the literatures of several academic disciplines.

Acceptability as a resource management concept

The concept of acceptability is central to the Limits of Acceptable Change system (Stankey *et al.* 1985) developed originally for Forest Service wildernesses and now widely applied on public lands. The creators of this planning process did not explicitly define what they meant by "acceptable," but they used the word in two senses: to describe what is legally permissible under the Wilderness Act of 1964, and to describe what wilderness users agree is desirable as determined during a consensus-driven planning process. Thus an "unacceptable" occurrence may imply circumstances of differing severity depending on whether one refers to a violation of federal law, or simply to an occurrence of change beyond that which users prefer. The consequences of "unacceptability" would likewise vary: failing to obey the law is likely to carry more severe sanctions than failing to achieve a desired future condition.

Visual resource management is another area of forestry in which acceptability to "the public" (generally defined as recreational visitors) has long been a primary objective. For example, the British Columbia Ministry of Forests (1981) defines its visual management challenge as being "to maintain acceptable forest landscapes and, at the same time, ensure that optimum economic and social benefits accrue to the people of the province" (p. 7). In most research on the stand-level impacts of forestry practices, the dependent variable that represented acceptability has been a measure of scenic beauty.

An unspoken assumption of this approach is that the most beautiful scenes are the ones visitors will find most acceptable. The problem with that assumption, as Gobster (1992) has pointed out, is that the concept of scenic beauty is "artificially constrained, both culturally and methodologically." If the public were to judge forests solely by their scenic

quality, acceptability could not be influenced by conscious thought nor by the senses of sound or smell. Moreover, an acceptable landscape would have to fit traditional Western conceptions of beauty. Forests that appear neat and tended may be considered more beautiful than ones that contain structural elements necessary for maintaining biodiversity. But is it right to assume that a visitor to the forest will judge his or her environment solely in terms of the anthropocentric value of enjoying scenic beauty? Or might some visitors acknowledge that a landscape is not as beautiful as it could be, but nonetheless judge it by an ecologic standard such as productivity, health, or biological diversity?

Lee (1976, cited in Magill 1990) has suggested that people search for meaning in landscapes, unconsciously asking themselves not only whether they like what they see in the forest, but also why the forest looks as it does. He developed a typology that classifies landscapes based on whether they are pleasing, and whether their meanings are decipherable. Scenes that are decipherable but disliked he called "unacceptable landscapes⁴." This conceptualization implies there is more to assessing a landscape than a simple affective response to a scene, but it doesn't address whether meaning is assessed in terms of anything other than the effect of landscape elements (or their associated causes) on scenic beauty.

Brunson and Shelby (1992a) considered distinctions between acceptability and beauty in the first published study of the scenic impacts of New Perspectives practices and conditions. They chose to operationalize the dependent variable not as an estimator of

⁴Lee's terminology did not refer to "acceptable" landscapes. Instead he distinguished between "sensual landscapes," which were liked but not understood, and "purposeful landscapes" which were both liked *and* understood. One might convincingly argue that either of the latter can be acceptable; apparently in Lee's view one can accept something without knowing why, but to find something unacceptable requires knowing what makes it unacceptable.

beauty, but as a Likert-type scale with which respondents judged the "acceptability" of several sites as locations for scenic viewing, hiking, and camping. Some study sites were under typical management (clearcutting, commercial thinning, old growth reserve) while others were New Perspectives research stands.

The study showed that the New Perspectives sites generally were judged more "acceptable" than traditionally managed sites for both scenic viewing and recreation. Acceptability was found to be influenced by information about ecosystem management, and judgments differed when based on photographs rather than site visits, when evaluators had all five senses engaged (Brunson 1991). We can infer from these results that cognition and non-visual sensory inputs do influence judgments of acceptability, as Gobster (1992) proposed.

Brunson's study did not examine how respondents decided something was acceptable or unacceptable when making their judgments, nor what that decision meant. There was no way of knowing, for example, whether a rating of "acceptable" for a given setting and social value implied any desire to choose that setting (or one like it) for a personal experience associated with that value. Nor was there any way to tell whether acceptability judgments were applied to the condition of the forest itself, or to the respondents' estimations of how the forest came to be in that condition.

Acceptability of conditions, or of causes?

In outdoor recreation research, a normative approach has been used to examine how people evaluate their environment (Shelby and Heberlein 1986). It is theorized that for a given setting, recreationists develop standards for a variety of social and ecological

conditions. These standards are said to be largely shared by veteran users or relevant subgroups of users. When shared standards (social norms) are exceeded, managers may need to take remedial action; i.e., if resource conditions become unacceptable to a significant proportion of a user population because of crowding, depreciative behavior, ecological damage, or conflict between users, strategies should be employed to return conditions to the acceptable range. Shelby, Vaske and Heberlein (1989) have even proposed a system to determine when conditions have become socially unacceptable in situations of crowding, as defined by the percentage of visitors feeling crowded.

Attempts have been made to establish norms for a number of conditions, including numbers of encounters with other visitors under varying circumstances, presence of bare ground or fire rings in campsites, and amounts of litter or human waste (Whittaker and Shelby 1989). These norms are measured by asking users to answer questions such as "It is OK to see damaged trees at campsites as often as ... out of every five days." By examining frequency distributions of responses, researchers can identify areas of normative consensus.

Cialdini, Reno and Kallgren (1990) distinguish between descriptive norms, which define what is typical or "normal," and injunctive norms, which refer to what "ought to be" and carry sanctions for violations. They point out that while injunctive norms serve to direct conditions toward the optimal by encouraging remediation when conditions become unacceptable, descriptive norms can have the opposite effect by fostering acceptance of conditions in a deteriorated state. For example, rates of littering are higher in places where litter is already found (Pitt and Zube 1987).

Fears about accepting sub-optimal conditions once they become "normal" affect many debates over forest allocation and management. The Limits of Acceptable Change process (Stankey *et al.* 1985), while acknowledging that change is inevitable in human-influenced systems, was specifically designed to prevent creeping incrementalism by setting minimum thresholds for resource conditions. Similarly, polarized attitudes in environmental politics are reinforced by fears that a "weakened" position (e.g., assenting to New Perspectives harvests but not to clearcuts) will become the new baseline from which future compromises will be built. As the Sierra Club's Michael McCloskey (1991) wrote, one consequence of the Reagan administration's antagonism to the environmental movement was that "... the movement came to expect less and less as normal, which lowered the threshold for acceptable performance" (p. 277). Seemingly strident positions espoused by environmental groups often represent a conscious strategic resistance to lowering the acceptability threshold.

The norms measured by Shelby and his colleagues can be either descriptive ("I can expect to see X people on the trail today") or injunctive ("I don't think I should have to see more than Y people on the trail today"). A debate is ongoing in the recreation literature about whether norms can truly be applied to settings, or if these are a superficially similar kind of evaluative standard (Roggenbuck *et al.* 1991; Shelby and Vaske 1991; Noe 1992). Central to the debate is the notion that social norms exist to maintain social order, the "glue" holding societies together (Parsons 1949). Order is maintained only if there are penalties for disorder. Since a setting cannot suffer sanctions for norm violation, some authors argue that standards for settings (e.g., acceptable numbers of encounters with other users of a particular wilderness) cannot be called norms. A wilderness visitor might decide that a setting is "too

crowded" because his or her standard for trail encounters was exceeded, but no social norm was violated unless a sanctionable behavior took place which made the wilderness crowded.

Regardless of whether sanctions can be imposed against a setting, normative approaches to outdoor recreation management call attention to the fact that negative evaluations of resource conditions tend to be associated with human behaviors and not with the conditions themselves. It is axiomatic that a recreation management system can address only those aspects of a natural system that can be influenced by managers. Accordingly, acceptability standards for conditions of a biophysical environment are set only if the conditions are perceived to be a function of recreation use. If a standard is set for the number of trees that may be killed by packstock-related soil compaction in a wilderness campsite, that standard is not applied to death caused by wind throw or insect depredation. The trees may be just as dead, but the impacts are largely beyond management control.

Comparing reality to its alternatives

By linking acceptability judgments with human behaviors as apart from "acts of God," we introduce to this discussion the concept of volition. Western cultures generally believe that societies as well as individuals have the option of performing an action or not doing so; i.e., behaviors result from conscious or unconscious choices between two or more alternatives. Therefore an environmental condition is judged more or less acceptable based on whether the evaluator believes the condition resulted from well-chosen behaviors.

Again the literature on norms offers insight. Kahneman and Miller (1986) argue that norms are not stored in memory as a sort of rulebook about specific locations or situations,

as the normative approach to recreation management seems to imply. Rather, they suggest that norms are computed after the fact:

"[E]ach stimulus selectively recruits its own alternatives and is interpreted in a rich context of remembered and constructed representations of what it could have been, might have been, and should have been."

In other words, a stimulus event or category name triggers a series of parallel cognitive representations which are then aggregated to produce a norm. These representations may be fragmentary, not necessarily accessible to conscious retrieval, and they may be aggregated to produce counterfactual alternatives that are constructed *ad hoc* if experience or memory cannot supply a factual one. If no alternative is believed to exist, what remains is, by definition, "normal."

Judgments of what is acceptable in a forest setting therefore depend not only on an observer's evaluation of the current environment, but also on his or her evaluation of likely alternative conditions. The imaginable repertoire of alternatives is a product of personal knowledge; one's preference for an alternative is a product of personal values.

For example, beliefs about the 1988 Yellowstone fires were influenced by knowledge about the role of fire in natural systems and about the effect of past park policies on fire behavior and protection efforts. This knowledge influenced the range of alternatives. To someone who knew little about ecology or Yellowstone, the alternatives might have been a "ruined" post-fire forest and a thriving unburned forest (in reality, a counterfactual alternative). More knowledgeable persons were likely to have a wider range of alternatives, and to recognize that the pre-fire forest was badly stressed and far from optimally healthy.

Yet even when knowledgeable persons evaluate the same range of alternatives, their values can lead to different judgments about the "acceptability" of post-fire Yellowstone. The condition may be unacceptable to persons already critical of the National Park Service, who attribute the condition to incompetence (Buck 1989) or misguided reliance on biocentric policies (Bonnicksen 1989). For those who value scientific challenges, the condition may be acceptable because it offers opportunities to learn more about fire in natural systems (Knight and Wallace 1989). To those who believe the fires to be inevitable and unstoppable (Romme and Despain 1989), the acceptability issue may be largely moot.

In general, an environmental condition is less likely to be judged unacceptable by some or all of the public if it is viewed as the least objectionable alternative within a range of alternatives, or if it is the unforeseeable and/or unpreventable consequence of human actions. There is also a third, related scenario that is increasingly important to the future of forest policy and management. For a growing number of people, a condition is likely to be acceptable to the extent that is viewed as a "natural" outcome (i.e., not influenced by human actions), regardless of whether it might have been foreseen or prevented.

In the ideology of environmentalism, there is a tendency to attribute positive or negative qualities to an environment based on the perceived extent to which humans have interfered with "natural" processes. What is natural is "right" or "beautiful" by definition. What is non-natural has at least the potential to be wrong or ugly. Thus Rolston and Coufal (1991) can write:

"Forests are never ugly, they are only more or less beautiful; the scale runs from zero upward with no negative domain. Even the 'ruined' forest, regenerating itself, has positive esthetic qualities, when trees rise to fill the space against the sky."

This viewpoint is rooted in the writings of Aldo Leopold (1949), who espoused a philosophy of biocentrism, arguing that humans must view themselves as part of the natural world rather than above it, and that there is a moral imperative to maintain all possible elements of the natural world. More recently there has been growing support for the "deep ecology" perspective of Devall and Sessions (1985), who extended Leopold's vision in declaring that human interference with the non-human world is excessive and worsening rapidly, and that non-human life cannot flourish without a decrease in human population. As a result, some people place higher value on those aspects of nature for which man's role is largely invisible or non-existent. One consequence of such a view is the suggestion, made by environmental ethicist Peter List at the Kelso workshop, that the most socially acceptable New Perspectives practice may be "silvicultural silence," i.e., no manipulation at all.

The element of risk

Underlying the analysis of alternatives is the question of risk. People who support the "silvicultural silence" approach to ecosystem management may believe that without human intervention, a forest can do no worse than remain in its present state, and will probably recover (albeit slowly) from any ill effects of forestry. Proponents of active ecosystem management are more likely to believe that the probability of accelerated recovery exceeds the risk of further catastrophe. As we shall see in subsequent chapters of this report, uncertainty about the risk associated with ecosystem management is a key influence on attitudes toward it.

The study of risk as a problem in applied psychology and policy is one area of social science in which "acceptability" is a recognized concept. Fischhoff *et al.* (1981) described the process necessary for technological societies to decide "how safe is safe enough?" The choice of a solution to an acceptable-risk problem depends on the range of alternatives, the consequences of those alternatives, and the intertwined facts and values associated with the alternatives and the evaluators. Those who would answer an acceptable-risk question must contend with five basic problems: (1) ambiguities in how to define the problem; (2) difficulties in ascertaining facts about the matter; (3) uncertainty about whose values are to be represented and how they are to be elicited; (4) the inevitable fallibility of experts; and (5) questions about how to evaluate the quality of the decision process.

These issues certainly apply to decisions about the acceptability of ecosystem management. Recent issues of the Journal of Forestry feature many discussions of ambiguity in defining the problems that confront forestry -- especially in defining "long-term sustainability," a concern which is at the heart of ecosystem management. For example, a Society of American Foresters task force, unable to specify exactly *what* in forests should be sustained, ultimately decided to omit any mention of sustainability in a new land ethic canon (Craig 1992).

Facts are also at issue. There is considerable debate about the extent to which traditional practice has harmed forest ecosystems. Much of the science on which ecosystem management is based is new enough that many foresters are hesitant to accept its validity (Atkinson 1992). Closely related are the issues of values and stakeholders. For example, how much emphasis should be placed on the needs of human forest-dependent communities?

As Lee (1990) points out, the forestry reform movement is rooted not only in ecological concerns, but also in value judgments about the merits of a capitalist economic system which has tended to foster environmental short-sightedness.

An especially thorny issue in forestry is expert fallibility. Because trees grow slowly in most of North America, mistakes take a long time to detect or correct. Predictions about the eventual effects of ecosystem management are not easily verifiable, being based largely on inferential evidence and reconstructions of past disturbance patterns. Critics of ecosystem management often point to earlier failures. As Fiedler (1992) put it, the skeptics "are unwilling to jump on the latest bandwagon, having seen the wheels come off so many wagons before." The length of time between treatment and result in forestry also complicates the choice of an evaluation/monitoring strategy. At what point can we decide whether ecosystem management works, if the results may not be seen for nearly a century?

When biological diversity and ecological integrity are at issue, increased risk means decreased acceptability. Johansson (1987) asked randomly selected Swedish citizens about their willingness to pay for programs that would save all of the endangered species in Sweden, save half of the species, save three-fourths of the species, or have a 50% chance of saving all species and a 50% chance of saving half of the species. Not surprisingly, the 100% level of protection was valued highest, and the 50% level lowest. Interestingly, although the mathematical probability in both the third and fourth choices was the same (75%), willingness to pay was higher for the third option, which guaranteed a level of species preservation. Apparently the risk under the fourth option that only half of the species would be saved outweighed the option's potential to save all of the species.

The importance of context

It is clear from even a cursory examination that the acceptability of a forest condition or a forestry practice cannot be considered apart from its context. Zube (1987) has found that assessments of landscapes are influenced by perceptions of how the land is used, and by the ways in which those uses jibe with the evaluator's value orientations and personal utility functions. Value-based assessment is also implied in the work of Hodgson and Thayer (1980), who found that photographs labeled "forest growth" were judged more scenic than the same photos labeled "tree farm."

Context is central to the "transactional paradigm" which guides research in environmental psychology. In a transactional view of experience, environment and behavior are said to be mutually defined, not explainable apart from their context (Ittelson 1973). Applications of this approach to natural resource management are beginning to appear; e.g., Pitt's (1989) analysis of how the quality of recreation settings depends on salient attributes of (1) the environment; (2) the participants; and (3) the interaction of environment and participant. Pitt notes that any given experience in an environment may depend upon one's companions, rate of travel through the setting, familiarity with similar settings, current physical condition, personal preferences, and on the rules governing behaviors in the setting. To this list might easily be added people's perceptions about how a recreation landscape came to be in its current condition, and about the risks to people or places or ecosystems that might be associated with that condition.

A contextual issue that is especially relevant to judgments of a forest condition or practice is that of "place," i.e., the meanings people attach to the particular geographic

settings where a New Perspectives condition or practice may be encountered or proposed. Approval of "environmentally friendly" practices in principle does not necessarily translate to blanket approval of the application of those practices at any location. For example, Taylor and Daniel (1984) found that education about the beneficial effects of fire did not change the acceptability of prescribed fire in recreation areas: "Forest users may increase their understanding of fire ... but that doesn't imply they're willing to pitch their tents in an area that's been prescribe-burned."

The classic example of generically acceptable practice being unacceptable in a specific locale is the so-called NIMBY (not in my backyard) syndrome. NIMBY disputes occur when environmental costs of a proposed action are geographically concentrated while the benefits are largely dispersed elsewhere (Kraft and Clary 1991). Often highly emotional, local NIMBY protests can expand rapidly into regional movements (Lee 1991). Chapter 5 of this report offers evidence of NIMBY in an ecosystem management context. Residents of an urban/forest interface neighborhood were surveyed about the scenic acceptability of different silvicultural practices, including an ecosystem-management partial harvest typical of those advocated in the Pacific Northwest. Stands harvested in this way were rated acceptable by 57 percent of the respondents. But when the same practices were depicted as occurring in the respondents' own backyards, the approval rating fell to 32 percent.

Backyards are not the only settings where generally approved practices are no longer considered acceptable. Recreationists have been found to be more critical of timber harvests in places they visit repeatedly and hold an emotional attachment for (Mitchell 1989; Martinson and Baas 1992). The place concept has been receiving renewed attention from

researchers in landscape architecture, geography, and outdoor recreation (e.g., Hiss 1990, Williams *et al.* 1992). Knowledge about the characteristics of special places, and of the people who tend to form such attachments, can be useful for managers hoping to identify where ecosystem management practices may be considered unacceptable.

Another contextual influence is the social environment. The acceptability of an ecosystem management practice or condition is likely to depend not only the attitudes of individuals, but also on the perceived opinions of relevant reference groups. Also influential is the social situation in which acceptability judgments are elicited.

Reference groups are "generalized others," groups to which a person belongs (or aspires to belong) which serve as standards for judging appropriate behaviors in situations where more direct cues such as previous personal experience are ambiguous or non-existent (Shibutani 1955). Because ecosystem management is not yet widely practiced, direct cues may be unavailable to most evaluators.

Carroll (1989) offers an example of reference group behavior that is particularly relevant to the ecosystem management issue. He points out that in the social world of a logger, anything the Forest Service does is suspect: "[N]egative evaluation of the Forest Service serves as an important unifying theme for loggers in the study area. One logger candidly stated, 'I'm a logger, so I'm supposed to hate the Forest Service'" (p.101). We might expect environmental activists to react similarly to Forest Service initiatives, although studies like Carroll's have not been conducted in the environmental movement.

The importance of reference groups may be heightened when judgments are elicited in a typical Forest Service setting -- the public involvement meeting. These settings may tend

to reinforce traditional reactions to government proposals because planning participants are asked to publicly voice their opinions in front of others who tend to be the most vocal advocates of partisan positions on forest management issues. In such situations, the social cost of going against a "correct" opinion may be too great. The acceptability of innovative proposals from the Forest Service may be more easily acknowledged in quasi-confidential settings, such as responses to public opinion surveys or personal meetings with agency personnel.

Threshold or target?

That which is acceptable is not necessarily that which is desirable. For example, the Random House Webster's College Dictionary offers four definitions of "acceptable." The first two of these carry positive-to-neutral connotations. The other are decidedly negative:

- (1) capable or worthy of being accepted.
- (2) pleasing to the receiver; agreeable; welcome.
- (3) meeting only minimum requirements; barely adequate.
- (4) capable of being endured; tolerable; bearable ("acceptable levels of radiation").

An important issue to consider is whether Salwasser's (1990) "socially acceptable forestry of the future" is one which is pleasing to the receiver, or one which is barely adequate.

As used in current natural resource management contexts, acceptability may be closer to the latter. For example, the assumptions underlying the Limits of Acceptable Change process (Stankey *et al.* 1985) are that change is inevitable, and change is inevitably bad. Therefore a manager's responsibility is to keep change within endurable limits; acceptability

standards define a threshold which conditions should not fall below. Partly this is an artifact of wilderness management, the purpose for which LAC was originally developed, since the ideal wilderness condition is assumed to lie at one end of a spectrum from the pristine to the profane. Because the ideal condition is acknowledged to be unattainable, acceptability must necessarily define a tolerance threshold which determines how far society is willing to stray from that ideal.

However, threshold approaches are also used when the ideal is attainable and a minimum level is barely tolerable, as Shelby and Jackson (1991) described in discussing the management of instream flows for rivers. Water allocations ensure that users have enough water to continue in existence, but not necessarily any more than that. This approach makes sense for uses where allocations beyond the required flow add little benefit, as may be the case when maintaining enough water to cover spawning grounds, or where there is a linear relationship between productivity and flow such that additional allocations push one closer to an unattainable ideal. But what of recreational boating, where a minimum "canoeing zero" flow provides a barely tolerable experience, but too *much* water is equally undesirable? Shelby and Jackson argue that it makes more sense in such cases to allocate flows for the *optimum* level -- i.e., to manage for a target instead of a threshold.

The question in ecosystem management then becomes: If we strive for social acceptability, are we shooting for a suitable target or are we sinking to an endurable threshold? The answer will depend partly on whether forest management is perceived as a social good or a necessary evil. If one assumes that "the public" views all timber harvest as detrimental, then the task becomes one of defining how much detriment society is willing to

withstand. The tendency in that case will be to choose a policy objective that sinks toward the lowest level of tolerance. But if one assumes that the public believes some timber harvest is desirable while too much harvest is detrimental, then an optimal level becomes a viable target, and the policy objective is more likely to be to strive for a "desired future condition."

The latter objective has been adopted by the Forest Service in theory, but there remains a danger of settling for the former. One reason is that it is virtually impossible to determine what an "optimal" level of ecosystem manipulation might be, beyond the obvious guideline that it is somewhat greater than the level espoused by the deepest deep ecologists, and somewhat less than the level in the collective dreams of the timber industry.

Decision models in economics and policy analysis tend to assume that evaluators are aware of every choice and have unlimited resources with which to reach a decision. Yet the choice of a socially acceptable forestry won't occur under ideal conditions, but under conditions constrained by political realities and scientific uncertainties. Simon (1959), considering the effect of such constraints on decision-making, concluded that when faced by even moderate uncertainty people tend to abandon the quest for optimal solutions in favor of ones that can be considered "good enough." He called this process "satisficing."

The problem of defining a socially acceptable forestry is one of satisficing. How much manipulation is too little? How much is too much? What confidence limits are we willing to place around a desired future condition? If the confidence limits are set too narrow, the likelihood of miscalculation increases. But if the confidence limits are set too wide, we return to a situation of managing for thresholds instead of targets.

Conclusion: Eight propositions about acceptability

Social acceptability has both political and philosophical appeal as a forestry concept. Many public programs and policies profess to use acceptability as a management guideline, yet its definition remains fuzzy. This literature review, undertaken in an attempt to clarify that definition, offered insights which can be summarized as a series of eight propositions:

1. *Acceptability may apply to conditions, but it is a function of causes.* Natural settings are judged not only by *what* is there, but also *why* it is there. The acceptability of a condition therefore depends partly on the acceptability of the practice that created the condition, and the acceptability of the practice depends partly on its purpose.

2. *Conditions that arise as a result of "natural" causes are virtually always acceptable.* We live in a society where "natural" is desirable. To many environmentalists natural events are always praiseworthy, even if detrimental to both human and non-human communities.⁵ Even the most traditional anthropocentrist is likely to view a natural event as, at worst, an "act of God" -- perhaps subject to lamentation, but not to condemnation.

3. *Acceptability of a condition is not an issue unless there are believed to be feasible alternatives to that condition.* One reason why natural causes are not unacceptable, even among those who don't believe "nature knows best," is that they are generally unforeseeable and unpreventable. No option to accept or reject was offered, so their consequences lie outside the realm of acceptability judgment.

⁵This position can lead to apparent inconsistencies, such as the environmentalist who opposed a soil conservation program in southern Utah because erosion is a natural process which shaped the geological wonders of the region (Hughes 1992).

4. *In the presence of feasible alternatives, acceptability is a function of the preferability, probability, and propriety of those alternatives.* Reality is judged relative to its alternatives. Such judgments will depend on individual preferences for alternatives, but also on the perceived likelihood that those alternatives *can* occur, and beliefs in the right to demand that they *should* occur.

5. *Acceptability is a function of the perceived risk associated with a condition or practice.* The greater the risk, or the greater the uncertainty about risk potential, the less acceptable a practice or condition will be. Among factors that affect risk perceptions are: the fatality of making an error, the extent to which consequences are localized, the length of time before consequences are known, and the length of time required to recover from error.

6. *Acceptability depends on the local context.* Practices and conditions that are acceptable in one setting will not be acceptable in another. Factors affecting local acceptability include place meanings (whether the location is special to someone), and the landscape context (whether the condition is rare or widespread within a defined landscape).

7. *Acceptability is a function of social influences.* Individual judgments are tempered by the judgments of others in one's reference group. A person may rationally decide that a practice is acceptable, yet behave as though it were unacceptable because to do so reflects the image he or she wants to project to important others.

8. *"Acceptability" can refer to a pleasing condition, or a barely tolerable one.* Attempts to set standards for acceptability often end up defining a tolerance threshold rather than a desirable, achievable target. When it's impossible to achieve what's best, individuals and governments too often settle for what's just barely good enough.

3. Issues and Concerns about New Perspectives Practices and Conditions

The previous chapter discussed in a general sense factors that can influence the social acceptability of New Perspectives practices and conditions, focusing on the meanings of acceptability judgments and the processes by which they are made. This chapter describes research identifying specific aspects of ecosystem management which influence acceptability judgments. Issues and concerns were identified through an exploratory, multi-method technique analogous to the "scoping process" in environmental impact assessment. The objective was to describe in an ideographic fashion the broad range of social values that may be affected by the implementation of ecosystem management. A listing of the issues identified by this process is contained in the concluding section of this chapter.

Primary sources of data for this phase of the project were the reactions of persons who had encountered examples of ecosystem management on field tours conducted at New Perspectives research and demonstration sites. Tour participants' reactions were expressed in two ways: as questions asked of tour leaders, and as responses to a survey instrument administered during the course of several tours. Reactions were also studied by interviewing recreational visitors to a study site on the Oregon State University research forest, and by analyzing audience questions and comments made at presentations about ecosystem management. Table 1 summarizes the events for which responses were gathered and analyzed. More complete details about participants, locations, and presenters is given in Appendix A.

TABLE 1: Summary of study locations and participants^a

<u>Group (no. participating)</u>	<u>Location</u>	<u>Data source^b</u>	<u>Presenters</u>	<u>Date</u>
Western Forestry & Conservation Assn. (90)	Andrews/ Blue River	Questions	Swanson, Hemstrom, Burditt, Franklin, McComb, Atkinson, Stankey	9/90
Amer. Forestry Assn. (15)	Andrews/ Blue River	Questions	Swanson, Burditt, McKee, Cissel	6/91
Oregon Native Plant Society (8)	Andrews/ Blue River	Questions Survey	McKee	7/91
OSU Sustainable Forestry Working Group (21)	Andrews/ Blue River	Questions	Swanson, Grant, Harmon, Denison	8/91
Western Forestry & Conservation Assn. (75)	Cedar River/ Plum Creek	Questions Survey	McCalmon, Paige, Arney, Crooker, Johnson, Snow, Bonagofsky, Oliver	9/91
Linfield College biology students (14)	Andrews/ Blue River	Survey	McKee	10/91
OSU Experimental College "New Forestry" class (3)	McDonald	Survey	McComb, Tappeiner, Pilkerton, Anderson, Brunson,	10/91
Eugene Group, Sierra Club (8)	Andrews/ Blue River	Survey	McKee	10/91
OSU Anthro. class (30)	In class	Questions	Brunson	11/91
Cascade Center forum (80)	Eugene	Questions Survey ^c	Swanson, Perry, Molina, Burditt, Hansen, Gregory, Cissel, Spies, Barnette, Johnson, Salwasser	4/92
Horseback riders (3)	McDonald	Interviews	n/a	5/92
Hikers (2)	McDonald	Interview	n/a	7/92
DaVinci Days (20)	Corvallis	Questions	Brunson	7/92

^aFurther details about groups, locations, and presenters can be found in Appendix A.

^bSources: questions asked of tour leaders, survey responses, and personal interviews.

^cThis survey, developed by the Forest Service, was given during a subsequent tour.

Both qualitative and quantitative methods were used to gather data, with emphasis on the former. Analysis was not intended to measure the depth of support/opposition or to rank the importance of issues and concerns associated with ecosystem management, but mainly to catalog and categorize issues that arose during discussions about New Perspectives practices and conditions. Therefore sampling was not random, but forums were chosen because they offered an opportunity to elicit responses from a wide range of potential stakeholders.

Qualitative data analysis techniques were used to categorize issues and identify patterns of response in the open-ended survey responses and questions asked of presenters. Survey data were analyzed using a constant comparison technique (Glaser and Strauss 1967) whereby categories were checked and cross-checked, and the results were examined using several typologies. Typological analysis (Henderson 1991) a shortened version of the constant comparison method, was used to categorize the questions asked of presenters.

The tour questionnaire (Appendix B) used a repeated measures format that combined qualitative and quantitative approaches to the research question. At the start of each tour, information about participants and their pre-tour attitudes were obtained using Likert scale and categorical response questions. At each tour stop, participants completed a one-page survey consisting mainly of open-ended questions which called for relatively unconstrained and potentially detailed responses (e.g., "Is there anything else you want to tell us about this stop?"). A third part of the survey used both categorical and open-ended responses to summarize reactions to the practices seen on the tour. All participants in the five surveyed tours were asked to complete surveys, although some persons failed to turn theirs in at the end of the trip. In all, responses to 99 surveys were analyzed.

Forest practices and conditions were described in the questionnaire by the term "New Forestry," rather than the somewhat broader "New Perspectives" preferred by the Forest Service, because the former name seemed to have attained greater visibility and acceptance through the media, and therefore was most likely to be recognized by a wide spectrum of tour participants. Moreover, the Western Forestry and Conservation Association-sponsored tours had been advertised under the name "New Forestry Field Trip."

Data-gathering continued until no new issues had been raised in three successive sampling events, suggesting that saturation of information (Strauss and Corbin 1990) had been achieved. While the format and purpose of demonstrations was likely to influence response, the variety of settings and presenters is believed sufficient to represent the range of likely issues and concerns. Nonetheless it should be acknowledged that further research may uncover new issues not identified here, especially if that research is conducted outside the Douglas-fir region of the Pacific Northwest.

Profile of study participants

As one might expect, tours demonstrating New Perspectives practices and conditions in the Northwest tended to attract west-slope foresters. Forestry professionals made up the audience for three of the five tours where participants' questions were analyzed. Foresters predominated at only one of the five tours where questionnaires were given, but it accounted for 51% of the total responses. The other tours attracted a broader range of non-foresters including teachers, college biology students, and environmental group members. Audiences for the off-site presentations included one consisting of Oregon State University anthropology

students (primarily liberal arts majors, but also some from natural resource programs), one in Eugene where the audience included a large number of natural scientists and environmentalists, and one during a summer science and technology festival where the audience had widely varying interests and educational backgrounds.

Additional information could be obtained about persons who responded to the surveys. Participants were asked about personal characteristics which previous research has shown may influence responses to scenic beauty and/or forestry attitude surveys (Ribe 1989). These included: personal familiarity or identification with a particular biophysical region; use of forests for work or leisure; occupational role; education or knowledge about forestry and New Perspectives; and affiliation with an environmental group. Responses to those items are summarized in Table 2.

Most participants identified themselves as Northwesterners⁶, with 63% from western Oregon or Washington. More than two-thirds use forests regularly for recreation, and 40% work in forests regularly. Many of those whose don't actually work in forests do forest-related work, as 65% identified themselves as having an occupational role associated with forestry, and an equal percentage reported at least one degree in forestry or biology. Of the 28% who had little or no *formal* forestry training, about half said they nonetheless know "quite a bit about forests and forestry." Most respondents said they knew something about New Perspectives silviculture before coming on the tour, but few considered themselves highly knowledgeable.

⁶The specific question used to identify place identification was: *What is your hometown? I.e., when you meet someone new, what town are you most likely to identify as the place you call "home"? This can be your current residence, or a place you've lived previously.*

TABLE 2: Personal characteristics of survey respondents (N=99)

Location of hometown	Western Oregon	27%
	Western Washington	36%
	Eastern Oregon or Washington	4%
	British Columbia	18%
	Other U.S.	10%
	East Asia/Pacific Islands	4%
Use of forests for leisure	Very frequent (at least 1/week)	35%
	Somewhat frequent (at least 1/mo.)	34%
	Occasional (several times/yr.)	26%
	Rare (no more than 1-2/yr.)	5%
Principal work location	In forests	40%
	In a non-forest setting	60%
Role that led to tour participation	Forestry professional (public)	20%
	Forestry professional (private)	38%
	Scientist or forest researcher	7%
	Student	13%
	Environmental group member	8%
	Other ^a	13%
Level of forestry education	Little or no forestry knowledge	13%
	Knowledge, but no formal training	15%
	At least one college class	7%
	College degree in biology	5%
	Bachelor's degree in forestry	42%
	Advanced degree in forestry	14%
Environmental group affiliation	No affiliation	20%
	Non-member, sometime supporter	48%
	Member, but not active	16%
	Active member	15%
Prior knowledge about New Persp. silviculture	None	13%
	A little	41%
	A moderate amount	38%
	A lot	9%

^aResponses included: teacher, corporate finance officer, journalist, attorney lobbyist, NIPF landowner, "citizen."

Slightly less than one-third of those who answered the questionnaires belonged to an environmental group. Of those, about half considered themselves active members. Further insight about the environmental orientation of respondents was offered by responses to a timber-aesthetics attitude scale (McCool *et al.* 1986) which was administered during the pre-tour phase of the survey (Table 3). This scale had been given previously to a number of groups which participated in a Montana study of interest group preferences for timber practices. A comparison (Table 4) shows that participants in the Western Forestry and Conservation Association tour, which was attended largely by industry, state, and provincial foresters, gave responses similar to those of forestry-related interest groups in Montana. Responses from the three groups surveyed on Andrews Experimental Forest tours -- the Eugene Sierra Club, Oregon Native Plant Society, and Linfield College students -- were higher (more amenity-oriented) than most Montana environmental groups.⁷

Although the study was not intended to measure attitudes toward ecosystem management in any general sense, knowledge about the overall attitudes of survey respondents does offer information about the context of their reactions to what they saw. Responses to the post-tour attitude questions (Table 5) were generally positive. Nearly half of the respondents considered New Forestry more appropriate than traditional high-yield practices -- including many people who were trained in (and now use) those traditional

⁷Responses to various measures of environmental world view have shown a gradual trend toward environmentalism in recent years (Arcury and Christianson 1990, Dunlap 1991). These results may be seen as further evidence of this trend, since McCool's study was completed nearly a decade ago.

TABLE 3: Overall mean responses to individual timber-aesthetics scale items^a

- 2.4 Scenery should not be a major consideration in designing timber sales.
 3.8 Some forest management activities can enhance the scenic beauty of an area.
 3.0 Areas which have been logged will eventually return to their original condition.
 3.1 Thinning a forest stand will usually increase its scenic beauty.
 3.6 For some recreation activities, a logged area is a better place than an unlogged area.
 2.7 Outside wilderness areas, timber is the most important resource on national forest lands.
^aMean responses are based on the following five-point scale: 1=Strongly disagree; 2=Disagree; 3=Neither agree nor disagree; 4=Agree; 5=Strongly agree.

TABLE 4: Comparison of interest group mean responses to timber-aesthetics scale^a

<u>Group</u>			
Montana Loggers Association	2.0	Helena Audubon Society	3.0
Missoula Society of American Foresters	2.5	Great Falls Audubon Society	3.1
<i>Western Forestry & Conservation tour</i>	2.6	Region 5 landscape architects	3.1
Region 4 landscape architects	2.6	<i>Linfield College biology students</i>	3.4
Univ. of Montana timber mgt. class	2.7	Missoula group, Sierra Club	3.5
Hellgate Motorcycle Club	2.8	<i>Oregon Native Plant Society</i>	3.5
Whitefish League of Women Voters	2.9	<i>Eugene group, Sierra Club</i>	3.7
^a Scores for Montana groups (in Roman type) are from McCool <i>et al.</i> (1986).			

TABLE 5: Post-tour measures of attitude toward New Perspectives practices and conditions

Overall attitude	Negative or very negative	8%
	Positive or very positive	58%
	Negative about some parts, positive about others	30%
	No opinion	4%
Comparison to traditional approach	New Perspectives is <u>more</u> appropriate	41%
	New Perspectives is <u>less</u> appropriate	10%
	Both approaches are equally appropriate	15%
	N.P. is better in some ways, worse in others	22%
	Not sure	12%
Likelihood of supporting use of N.P. practices on public land	Very likely or somewhat likely	67%
	Very unlikely or somewhat unlikely	7%
	Depends on the location	23%
	Not sure	1%

methods. Only 8% had overall negative reactions, and only 7% were unlikely to support any implementation of New Perspectives practices on public forest lands. In addition, 75% said they would at least consider visiting New Perspectives stands for recreation.

Respondents were also asked after each stop on the tour to give their reaction to what they had just seen. These, too, were largely positive. Negative reactions came most often at the first stop on a tour (the early Franklin experiments on the Blue River-McRae Creek divide, and a partial retention unit on the Seattle city watershed). Positive reactions to subsequent stands often were couched in terms of improvement over the initial stops.

Analysis of audience questions

Content analysis of audience questions identified a broad range of ecosystem management impacts, covering virtually every facet of forest management. After typological analysis, the questions were assigned to one of 10 issue categories: non-commodity resources (air, water, recreation, scenery, and special forest products); politics and policy; ecosystem processes/biodiversity; economics and timber yields; harvest operations; protection; planning; context and reliability of science; stand-level silviculture; and wildlife habitat management. There were 227 questions, many of which addressed two or three topic areas simultaneously. A complete list of the questions is provided in Appendix C.

Although the sample is representative of no population except that of people who participated in selected New Perspectives field tours and presentations in 1990-92, the frequency of responses (Table 6) may offer a rough indicator of the relative importance of these issues to the often-quite-specialized interest groups (e.g., foresters, environmental

TABLE 6: Topic areas of questions/discussion during field tours and off-site presentations

	On-site		Off-site		Totals	
	<u>N</u>	<u>Pct.</u>	<u>N</u>	<u>Pct.</u>	<u>N</u>	<u>Pct.</u>
Silviculture and regeneration at the stand level	60	32% ^a	3	7%	63	28%
Policy issues and political context	30	16%	15	37%	45	20%
Planning at landscape and broader scales	34	18%	6	15%	40	18%
Ecosystem processes and biological diversity	27	15%	12	29%	39	17%
Timber yields and economic returns	32	17%	5	12%	37	16%
Scientific reliability and validity	25	13%	12	29%	37	16%
Harvest operations	21	11%	1	2%	22	10%
Wildlife habitat management	16	9%	1	2%	17	7%
Production of non-commodity resources	11	6%	5	12%	17	7%
Forest protection/susceptibility to disturbance	11	6%	3	7%	14	6%

^aPercentages total more than 100% because many questions covered two or three issues

activists) at whom tours and presentations were directed. The presentations which attracted mostly foresters or biologists yielded more questions than those with largely non-forestry audiences. One reason for this is that foresters are already more familiar with the subject matter of the tours, and therefore may be better able to formulate questions. Several non-foresters, responding to a survey item asking if wished they'd heard more about a particular topic, said they'd already gotten as much information as they could handle. The non-forester tours also tended to be shorter in duration, have fewer presenters and fewer participants.

One consequence of this imbalance is that issues identified by question analysis may over-represent foresters' concerns. For example, while silviculture was the topic of the most questions overall, most of those questions came during the two tours sponsored by the Western Forestry and Conservation Association. Questions about silviculture were also more likely to refer to a particular site or practice, while questions on other topics generally had broader applicability for the future application of ecosystem management.

Question themes emerged in the course of several presentations: At both WFCA tours, silvicultural and operational issues dominated; the American Forestry Association tour focused on broader matters of science and policy; the OSU Sustainable Forestry tour stressed ecological aspects of New Perspectives; and at the Cascade Center forum the discussion centered on issues of politics, biology, and the conduct of science.

The kinds of questions that were asked depended on the interests of participants and presenters; different presenters' ability to evoke discussion and/or explain complex topics unambiguously; time constraints; unique aspects of the conditions seen at the tour stops; and the content of the immediate previous question. To minimize some of these influences,

questions were categorized as either specific (e.g., "How many snags did you leave in that clump over there?") or broad ("What rules do you use to decide how many snags are enough in a given stand?"). The latter may better represent concerns have about New Forestry in general. In all, 150 of the 227 questions recorded (66%) were considered to have broad applicability (Table 7). These were more evenly distributed across topic areas, with six categories drawing between 25 and 40 questions each: politics, silviculture, ecosystems, science, economics, and planning. Issues associated with these six topic areas may be especially likely to affect public acceptability.

Analysis of questionnaire responses

The survey included several questions intended to tease out potential concerns about New Perspectives practices and conditions. The most straight-forward of those were directed toward respondents' judgments of the New Forestry stands encountered. In Part II, the portion of the survey that was repeated at the end of each tour stop, respondents were asked whether their overall reaction to a stop was positive, negative, or mixed, and then asked *why* they'd given that answer. The post-tour phase of the questionnaire (Part III) asked respondents for features of New Perspectives management that they liked or disliked most. Insights on issues could also be found in the aspects of each stop that were most memorable. The final Part II question, asking for any additional comments, gave people yet another chance to voice their concerns.

Reasons for reactions to individual stops are summarized in Table 8. Positive responses to individual stops tended not to be prompted by evaluations of the conditions

TABLE 7: Specificity levels of questions in different topic areas

<u>Topic</u>	<u>Specific</u>	<u>Broad</u>
Silviculture and regeneration at the stand level	31	33
Policy issues and political context	7	38
Planning at landscape and broader scales	14	26
Ecosystem processes and biological diversity	10	29
Timber yields and economic returns	11	26
Scientific reliability and validity	6	31
Harvest operations	6	16
Wildlife habitat management	3	14
Production of non-commodity resources	7	10
Forest protection/susceptibility to disturbance	4	10

TABLE 8: Reasons for positive, negative, or mixed reactions to individual tour stops

<u>Positive responses (N=71)</u>	<u>N</u>	<u>Pct.</u>
A progressive attitude toward forestry was shown	25	35%
Biodiversity was enhanced and/or protected	11	15%
An attempt was made to find a balance	10	14%
It allows more options for the future	8	11%
Stated silvicultural objectives were met	5	7%
I got information relevant to my job	5	7%
It appeared to be economically feasible	2	3%
It was visually acceptable	2	3%
A natural seed source was provided	1	1%
Worker safety was adequately protected	1	1%
Slash loadings were acceptable	1	1%
<u>Neutral or mixed responses (N=55)</u>		
There's too much uncertainty about results	12	22%
It was still too focused on timber production	12	22%
Not enough information to make a judgment	7	13%
Objectives of the treatment were unclear	5	9%
The unit's design was flawed	4	7%
Uncertainty over industry or public acceptance	3	5%
It was unnecessary to achieve biodiversity	3	5%
Too difficult to regenerate new forest	2	4%
Too difficult to protect forest health	2	4%
Too much slash was left behind	2	4%
Burning was used for site preparation	1	2%
It wasted trees	1	2%
It cost too much	1	2%

produced by New Perspectives practices, but rather by the reasons why those practices are being tested and demonstrated. This is consistent with the proposition made in Chapter 2 of this report that the acceptability of an outdoor environment is evaluated in terms of its human-associated causes. Fully half of the positive responses referred to political motivations for New Perspectives silviculture (to be progressive or to seek compromise). Another 25% referred to the expressed objectives of the practices (preserving biodiversity and/or management options). Most of the rest commented on the feasibility of the practices without passing judgment on whether they *should* be used.

Negative or mixed responses to stops on the Seattle (WFCA) tour generally focused on a perceived uncertainty about future biological impacts, while reactions on the Andrews tours tended to criticize the extent to which practices deviate from current management directions. (Some people thought what they'd seen deviated too widely from standard practice, others felt it was too similar to standard practice.)

Opinions about positive and negative aspects of New Perspectives in general are summarized in Tables 9 and 10. When asked to describe positive aspects, respondents most often listed the new practices' emphasis on preservation of species, habitats, and ecosystems. Other common themes referred to the perception that ecosystem management is more scientifically or environmentally progressive. Negative aspects focused most often on cost (both in terms of economics and future wood/fiber production); uncertainty and speed of implementation (i.e., the idea that application is preceding research and development); and political aspects. Nearly half of the negative reasons could be characterized as complaints about the perceived position of New Perspectives management along a use-preservation

TABLE 9: Best-liked aspects of New Perspectives silviculture

<u>General statements</u> (18% of responses)	<u>N</u>
It tries to meet new scientific challenges	12
It's adaptive, not merely a cookbook approach	8
It provokes thought, stirs debate	2
It lets us "buy time" until science catches up	1
It's another tool for the tool kit	1
<u>Statements about silviculture/management/operations</u> (27%)	
It retains more trees than clear-cutting	8
Site impacts are less severe	7
It focuses on multi-resource integration	7
It considers activities in their landscape context	6
It provides a natural source of regeneration	3
Harvest units are smaller	3
It considers long-term site productivity	2
<u>Statements about ecosystem concerns</u> (38%)	
It protects diversity of species and structural components of ecosystems	34
It preserves wildlife habitat	10
It mimics natural disturbance patterns	7
<u>Statements about societal issues</u> (17%)	
It shows sensitivity to changing public values and attitudes	13
It's a palatable compromise	4
It's aesthetically preferable to clear-cutting	3
It can enhance forestry's public image	2

TABLE 10: Least-liked aspects of New Perspectives silviculture

<u>General statements</u> (35% of responses)	<u>N</u>
There's too much uncertainty about long-term benefits	12
It lacks a solid scientific basis	7
It's being applied on a uniform, cookbook basis	7
It lacks concrete silvicultural objectives	5
It's not being adopted quickly enough	3
It looks more "new" than it really is	2
There aren't adequate monitoring plans	2
<u>Statements about silviculture/management/operations</u> (31%)	
Not enough trees are retained	7
Stand re-establishment is more difficult	7
It poses safety problems for harvesters	5
Too many trees are retained	4
Too many snags are retained or created	3
Too much woody debris is retained	2
The blowdown potential is too great	2
It allows harvest to occur on steep slopes	2
It could lead to increased roading	1
Too much focus on multi-resource integration	1
<u>Statements about ecosystem concerns</u> (4%)	
It doesn't provide sufficient biodiversity	2
It cannot substitute for a natural stand	2
<u>Statements about societal issues</u> (30%)	
It costs too much	13
It's driven by public opinion rather than science	7
It's aesthetically displeasing	5
It wastes wood and fiber that society needs	3
It's not sensitive enough to public concerns	3
It's politically infeasible due to industry intransigence	2

continuum; e.g., the idea that "too few" or "too many" structural elements were retained in stands. There were more things that people disliked about the New Perspectives units than things that were liked; however, each of the dislikes tended to be shared by fewer people.

An interesting feature of this portion of the analysis was that the same aspects which were most likely to be viewed positively were often the ones which were most likely to be viewed negatively. For example, the second-most-cited positive aspect of New Perspectives was that it shows sensitivity to changing public attitudes and values. However, one of the most frequently cited negative aspects was a perception that New Perspectives is driven by public attitudes and values rather than by science.

Initial impressions of New Perspectives harvest units are likely to have a disproportionate impact on attitudes toward the practices and conditions seen in those sites. Accordingly, respondents were asked after each tour stop to list the most memorable aspect(s) of that location. These are classified in Table 11 in terms of their "pervasiveness," i.e., the extent to which a particular reaction occurred across settings and tour groups. Pervasiveness offers a rough measure of how much a particular aspect of New Perspectives silviculture is likely to influence overall judgments of practices and conditions. High pervasiveness describes issues that were mentioned at three or more stops, or nine or more times altogether. These are issues that are likely to concern more than one interest group, and are not confined to a single forest condition or silvicultural system. Moderate pervasiveness describes categories that were mentioned at two or more stops and by five or more people. Low pervasiveness describes categories mentioned at only one stop, or by four or fewer people.

TABLE 11: Most memorable aspects of individual tour stops

High pervasiveness

1. Practical, stand-level aspects of New Perspectives implementation (shapes of harvest units, site preparation methods, numbers of trees or snags left)
2. Silvicultural prescriptions and objectives over time
3. Concerns about regeneration and regrowth
4. Uncertainty about the stand- and landscape-level effects of New Forestry over time
5. Aesthetic impacts

Moderate pervasiveness

1. Quality of trees retained in harvest units
2. Benefits to wildlife
3. Use of snags and structural elements in New Forestry prescriptions
4. "Naturalness," especially the objective to mimic natural disturbance patterns
5. Economic costs associated with New Forestry
6. Attention to landscape-scale aspects of forestry
7. Susceptibility of New Forestry units to disease, insects, fire, or wind damage
8. "Newness" of methods being demonstrated
9. Safety of loggers and other harvest workers
10. Practical aspects of harvest operations, e.g., yarding systems, bucking guidelines

Low pervasiveness

1. Erosion or compaction of soils
2. Increased attention to role of down woody material in ecosystems
3. Opinion of harvest operators having experience with New Forestry
4. Role of public opinion in shaping New Forestry prescriptions
5. New Forestry as evidence of corporate citizenship

The most pervasive aspects of New Perspectives stands -- i.e., the ones which influenced several participants over a range of tours or locations -- were associated with the appearance of stands (especially the starburst-shaped harvest unit at Cedar River) or respondents' visions of the stands' future development. Economic and operational aspects, as well as philosophical issues such as the "naturalness" or "newness" of the practices, were moderately influential on first impressions.

Among people whose *overall* reaction to New Perspectives practices was negative (as expressed in Part III of the survey), cost-related issues were generally mentioned as being most memorable. Persons having neutral or ambivalent attitudes were disproportionately likely to mention their uncertainty about the future. A broader range of impressions was listed by persons whose overall attitude toward New Forestry is positive.

Uncertainty about the results of the new practices was expected to be (and was) a contributor to negative evaluations of their acceptability. Accordingly, the survey asked respondents to list aspects of ecosystem management that they would have liked to get more information about.⁸ The most commonly perceived information gaps were, in descending order of frequency: long-term silvicultural objectives; economic costs and impacts; the extent to which New Perspectives practices and conditions will be more or less acceptable to relevant interest groups; the likelihood of enhancing biological diversity; regeneration of Douglas-firs under partially retained canopies; and the implications for logger safety.

⁸Respondents were asked to complete the sentence, "I wish that the speaker had said more about ... " This form was used because a secondary purpose of the survey was to evaluate participants' reactions to the tour itself. Where responses listed topics of broad applicability rather than site-specific issues, it was assumed these were potential sources of uncertainty.

The first two issues accounted for 35% of all responses to this question. The economics issue arose on every tour, and at the time was probably the most universally acknowledged shortfall in our knowledge about ecosystem management. Since the tours, however, the effect of New Perspectives silviculture on stand growth and timber yields has been the subject of at least two analyses (Birch and Johnson 1992; Long and Roberts 1992) which address many of the most frequently asked questions.

The final question at each stop asked respondents if there was anything else they wanted to comment upon. This question offered a final opportunity to voice concerns that weren't addressed in the tour presentations. The 43 responses to this question were most likely to express criticisms about forest ecosystem science and its relationship to management (e.g., charges that potential adverse impacts on some wildlife had been ignored, or that implementation is occurring before there is adequate data and monitoring plans). Some people repeated objections made in other parts of the survey, and a few respondents used the opportunity to question the basic need for a change in practices.

The short survey administered by the Forest Service on its May 17, 1992, Cascade Center tour asked for comments on four topics: subject matter, speakers, logistics, and suggestions for future workshops/field trips. While most responses referred specifically to the tour, the last item elicited comments on issues not raised in previous surveys: the effects of woody debris retention on landslide processes; the place in ecosystem management for non-forest plant associations such as sphagnum bogs or sedge meadows; and the role of ecosystem management in promoting greater involvement of minority/underclass members in forests.

Interviews with recreationists

One finding from the questionnaire analysis was that the kinds of concerns expressed about New Perspectives differed with the situation or role of the person who expressed them. For example, privately employed foresters raised different issues than publicly employed foresters, and environmental activists raised a third set of issues (see Chapter 4 for discussion of the differences between interest groups). This finding is consistent with the transactional perspective on acceptability, which would suggest that responses will differ depending on the context in which a forest is encountered.

Recreation use is an important context for evaluating forests, but was not represented in the questionnaires or audience questions. No one attended a tour or presentation in their capacity as a recreationist. Although Brunson and Shelby (1992a, 1992b) measured the effects of New Perspectives silviculture on judgments of the acceptability of stands as recreation places, they did so without directly asking how the New Perspectives condition affected those judgments. Furthermore, the transactional viewpoint suggests that persons who visit a recreation area of their own accord may judge a place differently than persons who are brought there specifically to make such judgments (Pitt 1989).

Accordingly an attempt was made to interview recreational visitors who had chosen on their own to visit a New Perspectives stand in the Oregon State University research forest. There was neither time nor manpower to systematically monitor the study area, and two visits were made without encountering any recreational users, so that ultimately only five people were interviewed. These interviews, described in Appendix D, brought no new issues to light. They did suggest that ecosystem management can have both positive and negative

influences on recreation experiences. For example, while partial cutting diminishes the scenic quality of mature sawtimber stands, increased light and temperature can make the stands more pleasant to visit at certain times of year. The tradeoffs may be more equitable in a New Perspectives harvest unit than in a clearcut, where scenic impact is greater and temperatures may be too hot in summer and too cold in winter. Logging on tractor ground can also increase recreation opportunities by creating new pathways across forests, as noted by the horse riders who were interviewed.

It is interesting to note that four of the five interviewees visited the study areas regularly both before and after the New Perspectives harvest occurred. Preliminary data from a study by Rebecca Johnson and Richard Balfour (pers. comm.) show that visitation to one of the McDonald Forest study sites actually increased 40% the year after the area was harvested. However, responses from persons who visited the study area both before and after logging indicated that for many, the harvest had decreased the quality of their recreation experiences, if not the frequency of their visits.

The field tour questionnaire included a question asking whether participants would be likely to make a recreation visit to a stand where they knew New Perspectives practices had been used. Forty-three percent said they would be likely to do so, while 23% said they would not, and 26% said it would depend on the location.

Identified issues and concerns

Following is a complete listing, organized by topic area, of the issues and concerns which were raised in survey responses, interview and audience questions. Although some

are technical issues and others are of broad public interest, each could in some way influence the social acceptability of New Perspectives practices and conditions among one or more relevant publics. Issues and concerns are described in the form of questions, many of which could be easily incorporated in an ecosystem management research agenda. The number of issues identified here is necessarily shorter than the total number of responses received, since some issues were raised frequently during the course of the study.

Silviculture and regeneration at the stand level

1. How many trees and snags, and what sizes of trees and snags, must be retained in order to meet objectives for structural heterogeneity?
2. What replanting challenges are associated with New Perspectives prescriptions?
3. What is the effect of green tree retention on growth rates over the next rotation?
4. What are the anticipated silvicultural characteristics (density, average dbh, etc.) of a New Perspectives partial-harvest unit at the end of the next rotation?
5. Can intensive forest management such as pre-commercial thinning or genetic improvement be accomplished underneath a residual canopy?
6. What rotation lengths are anticipated for New Perspectives stands?
7. Can Pacific yew trees be maintained in stands managed under these prescriptions?
8. What are the guidelines for deciding whether to create additional snags in these stands?
9. What kinds of vegetation control (herbicide use, etc.) are possible in New Perspectives stands?
10. How does ecosystem management affect seedling survival?
11. What are the possibilities for future harvest of retained trees?
12. How must retained trees and snags be distributed through a stand?
13. How much variety in silvicultural prescriptions is acceptable in ecosystem management?

14. What sizes of harvest units are envisioned under New Perspectives?
15. What are the possibilities for intermediate treatments such as commercial thinning?
16. What are the possibilities for productivity enhancement (i.e., fertilization)?
17. Does leaving coarse woody debris in stands encourage seedling damage by providing habitat for herbivorous rodents?
18. How much coarse woody debris is enough to leave in a stand?
19. What kinds of site preparation are possible or permissible in ecosystem management?
20. Can prescribed fire be used as a silvicultural tool?
21. Is there a place in ecosystem management for harvest that doesn't retain any trees?
22. What rules about the quality of retained trees must be followed in order to ensure that natural regeneration won't come from inferior seed sources?

Policy issues and political context

1. What is Congress' position on ecosystem management, and will it be the subject of prescriptive legislation?
2. How is the public involved in choosing ecosystem management options?
3. Can ecosystem management ease public and congressional concerns about clearcutting?
4. How will environmentalist organizations respond to ecosystem management as a philosophy and as a set of practices?
5. How will the timber industry respond to ecosystem management as a philosophy and as a set of practices?
6. How will shareholders in timber companies respond to implementation of ecosystem management practices on private landholdings?
7. How will the news media respond to ecosystem management?
8. Will ecosystem management be seen as a compromise between preservation proposals and traditional forestry, and if so, will it be seen as the *proper* sort of compromise?

9. How will the Forest Service (and other agencies) adapt to ecosystem management?
10. How can the forestry community educate the public about ecosystem management?
11. What are the liability implications of doing New Perspectives harvests on public and private lands?
12. Should New Perspectives harvest be allowed in the remaining old growth stands?
13. Is it proper policy to institute practices which are designed in part to hide the aesthetic impacts of timber harvest?
14. What is the prognosis for continued funding of New Perspectives research, development and application?
15. Is ecosystem management truly a change in philosophy, or simply a propaganda ploy?
16. Will ecosystem management promote opportunities to bring minority/underclass members into the forest?
17. Do we really know whether the public wants a change from traditional forestry practice?
18. Does the adoption of New Perspectives practices by private companies promote their image as good "corporate citizens"?

Planning at landscape and broader scales

1. What spatial scales are appropriate for New Perspectives planning?
2. How are road effects incorporated into New Perspectives planning?
3. Is ecosystem management (as demonstrated in western Oregon and Washington) intended for implementation outside the Pacific Northwest Douglas-fir region?
4. When and how does the public become involved in New Perspectives planning?
5. What new public involvement strategies are included under New Perspectives?
6. How can landscape-level planning under New Perspectives adjust for multiple ownerships and cross-boundary issues?
7. How are wilderness areas incorporated into New Perspectives planning areas?

8. How can managers choose among the enormous number of solutions that are available when planning at the landscape level?
9. What sorts of modeling advances are necessary to plan at landscape or larger scales?
10. How can GIS and satellite imagery be incorporated into landscape-level planning?
11. How can the planning process be designed to ensure that ecosystem management is done adaptively and on a site-by-site basis, rather than using a "cookbook" approach?
12. What kinds of training and expertise are necessary before foresters can successfully handle the additional complexities of planning at landscape and larger scales?
13. What is meant by "desired future condition," and who will be decide what is "desired"?

Ecosystem processes and biological diversity

1. How will the retention of a diversity of hardwood and softwood tree species in New Perspectives units affect the health of forests dominated by Douglas-fir?
2. How will New Perspectives silviculture affect the microclimate (temperature, brightness, etc.) of harvested stands?
3. Will a New Perspectives approach do more to protect ecosystem health than a simple "hands-off" policy?
4. Will a New Perspectives approach do more to protect species diversity than a simple "hands-off" policy?
5. Will a New Perspectives approach do more to protect species diversity than an industrial high-yield management strategy?
6. How will switching to minimum fragmentation strategies of timber harvest allocation protect biological diversity?
7. What effects do riparian buffers have on stream ecosystems?
8. How will the retention of snags and green trees affect fog capture and associated hydrologic processes?
9. Will woody debris prescriptions be sufficient to maintain long-term productivity in New Perspectives stands?

10. What are the nutrient gains associated with a shift to ecosystem management practices?
11. What are the effects on oxygen and carbon dioxide of a shift to ecosystem management?
12. In situations where timber yields must be reduced in order to preserve biological diversity, what population levels must be maintained for any given species?
13. Will ecosystem management promote the retention of nitrogen-fixing old growth species?
14. How much biodiversity is "enough," and how do we know if we've got it?
15. Will "created" old growth function the same way as old growth that develops over time?
16. How will woody debris retention affect erosion processes on forested slopes?
17. Will ecosystem management affect the frequency or size of landslide events?
18. How will ecosystem management affect non-forest plant associations in forested areas (e.g., sphagnum bogs, sedge meadows)?

Timber yields and economic returns

1. What impacts will ecosystem management have on the budgets of government bodies that rely on timber-generated revenues?
2. Will the acreage under harvest be expanded to compensate for reduced per-acre volumes?
3. What is the impact on timber yields of shifting from a staggered-setting to a minimum-fragmentation strategy?
4. How will the retention of structural elements in stands affect subsequent yields for the next rotation?
5. How will ecosystem management affect opportunities for salvage harvest in fire-, insect- or wind-damaged stands?
6. Will ecosystem management lead to increased yields of trees other than Douglas-fir which are commercially important sources of wood fiber or construction materials?
7. Will ecosystem management ultimately enhance timber outputs by forestalling losses in site productivity?
8. How will the annual allowable cut be reduced by a shift to ecosystem management?

9. How many timber jobs will be lost due to reduced harvest under ecosystem management?
10. What is the value of sawlogs that are left behind to meet leave tree, snag, and woody debris requirements?
11. What is the change in costs to public agencies to plan and administer New Perspectives timber sales?
12. Will consumers be willing to pay the additional costs of timber when ecosystem management is standard practice on Forest Service lands?
13. What is the potential increase in economic value of species such as alder or Pacific yew that will be encouraged under ecosystem management?
14. How are timber yields affected by management for mixed-species stands?
15. What price must lumber bring before timber companies can afford to bid on a typical New Perspectives sale?
16. Will a shift to ecosystem management on federal lands force U.S. lumber purchasers to import supplies from overseas, and will this in turn promote a loss of biological diversity in Third World forests?

Scientific reliability and validity

1. Will public and intra-agency pressure for change force premature adoption of ecosystem management practices before they're adequately conceived and tested?
2. What is being done to monitor changes in biological, social, and economic conditions associated with the implementation of New Perspectives practices?
3. Will scientific assessment of ecosystem management focus on biological questions to the exclusion of social or economic questions?
4. How can scientific assessments of ecosystem management remain unbiased and independent of politics?
5. How can research and management be more closely integrated?
6. What is the role of lay information and local ecological knowledge in the development of ecosystem management practices?
7. Do we know enough about old growth forest systems to adequately simulate them?

8. Do we know enough about landscape ecology to base a management philosophy upon it?
9. How confident can we be of the models used in ecosystem management?
10. How can information gained by European foresters be incorporated into ecosystem management systems developed for North America?

Harvest operations

1. How much more will it cost to log a New Perspectives stand?
2. Is more sale administration work is required for a New Perspectives harvest?
3. How much more pre-logging planning is required for a New Perspectives harvest?
4. What is the potential for increased worker injury or death in New Perspectives units?
5. How can logger safety be maintained in New Perspectives partial harvest units?
6. Is the current logging work force sufficiently skilled to harvest New Perspectives stands?
7. Do logging companies currently have the equipment necessary to harvest New Perspectives stands?
8. Does New Perspectives harvest affect loggers' ability to provide logs in the piece sizes demanded by the mills?
9. How does New Perspectives harvest affect logging-related soil compaction?
10. What are the operational and safety implications of artificial snag creation?
11. How do government safety regulators respond to New Perspectives harvest plans?
12. How is the conduct of logging operations affected by requirements for woody debris retention?
13. Can ecosystem management practices lead to increased efficiency on a per-acre basis?

Wildlife habitat management

1. Do we know enough about wildlife habitat requirements to be able to maintain all the necessary habitat components?

2. Do artificially created snags meet the habitat requirements of all species that use natural snags?
3. How will a shift to minimum fragmentation strategies affect populations of edge-dependent species?
4. Will New Perspectives harvest patterns provide a sufficient number and variety of corridors to meet the dispersal needs of all species?
5. How will ecosystem management affect populations of game bird and mammal species?
6. Are woodpeckers the best indicator species to be using in New Perspectives harvest planning?
7. How will ecosystem management affect the viability of the Northern spotted owl, marbled murrelet, and other endangered species?
8. Can ecosystem management help protect salmon stocks?
9. Will every acre of forest be managed for every species that could potentially occur there?
10. How will ecosystem management change the length of time after harvest before a stand is used by wildlife?

Production of non-commodity resources

1. How will water quality be enhanced or degraded as a result of a shift to ecosystem management?
2. How will New Perspectives silviculture affect the quality of recreation experiences?
3. How will New Perspectives silviculture affect the quantity of recreation visits to a setting where those practices are used?
4. How will New Perspectives silviculture affect the spiritual qualities associated with mature forests?
5. How will New Perspectives silviculture affect the scenic quality of forests at both the stand and landscape levels?
6. How will New Perspectives silviculture affect the availability of non-timber forest products such as mushrooms, berries, beargrass, etc.?

7. Will New Perspectives practices be sufficiently different from standard practice to address concerns about the aesthetic impacts of timber management?
8. Will a shift to ecosystem management affect the availability of water during dry periods?

Forest protection/susceptibility to disturbance

1. What are the implications for maintenance or eradication of root rot pockets?
2. How will ecosystem management affect the abundance of parasites that control phytophagous pests?
3. Will implementation of New Perspectives silviculture increase the size or frequency of wildfire events?
4. Will implementation of New Perspectives silviculture increase the size or frequency of wind damage?
5. Will implementation of New Perspectives silviculture increase the size or frequency of insect outbreaks?
6. Will implementation of New Perspectives silviculture increase the size or frequency of disease outbreaks?
7. Will a shift from staggered-setting to minimum-fragmentation approaches affect the size or frequency of disturbances?
8. Will ecosystem management allow the use of standard strategies for insect and disease eradication?
9. How does the species or placement of retained green trees and snags in New Perspectives units affect the susceptibility to windthrow?

4. Variation in Responses to New Perspectives Silviculture

To set a goal of achieving "social acceptability" for forest practices and conditions implies that there is identifiable unity of public opinion about what should and should not be found in forests. Yet there is little evidence that such consensus can or will ever exist. Certainly the current debate over forestry in the Pacific Northwest is characterized by conflict and polarization that render true consensus unattainable, at least in the short run. As Fischhoff *et al.* (1981) noted in their analysis of environmental risk, "there is no such thing as a universally acceptable option."

Sociologist Jürgen Habermas (1989) has noted that while public opinion cannot exist as a unified entity, it serves as a "constitutionally institutionalized norm." Western governments invariably act as though their policies reflected an expression of popular will. That is, while we may tacitly acknowledge that for an issue such as the management of public forests there can be no universally acceptable set of policies, our democratic system demands that we behave politically as though such a thing were possible.

One goal of this research therefore is to understand how the implementation of ecosystem management might affect the institutionalized norm of public opinion about forests. If the acceptability of a forest condition depends upon the cause of the condition, then the social acceptability of New Perspectives conditions is not separable from the practices that created those conditions. A study of attitudes toward New Perspectives stands therefore is not possible without simultaneously examining attitudes toward New Perspectives in general, as well as the practices it encompasses.

There have been numerous studies of attitudes toward forestry practices, often in conjunction with studies of visual or recreational impacts of those practices (e.g., Hamilton *et al.* 1973; Becker 1983; Nelson *et al.* 1989). However, the ecosystem management/New Perspectives concept is still largely unfamiliar to the lay public, and specific research about those practices has yet to be done. Papers that discuss the social consequences of New Perspectives often focus on how the authors believe the public *should* react (e.g., Atkinson 1992; Maser 1992), but little evidence yet exists as to how they actually *do* react.

Scientific assessments of attitudes toward ecosystem management, New Perspectives, or New Forestry have been confined so far to relatively narrow categories of affected publics such as forest management agencies (Shepard 1990) and resource-dependent communities (Gale 1991). Brunson and Shelby (1992a, 1992b) examined reactions to New Perspectives stands by persons sampled as representatives of a broader public, but restricted their study to scenic and recreational impacts. One objective of the present study, then, was to learn about attitudes expressed by a wider range of publics, covering a greater number of impacts.

Previous assessments of acceptability

Shepard (1990) discussed factors influencing how ecosystem management might be received within the Forest Service itself. It may seem contradictory that the Forest Service would reject New Perspectives or ecosystem management, since those were initiated within the agency. However, there is some uncertainty whether ecosystem management will survive as a true shift toward holistic forestry, or simply as a name for a slightly revised version of traditional forestry. The agency's motives have been called into question since the start of

New Perspectives, with some observers such as Brown and Harris (1992) arguing that a true paradigm shift is under way, while others characterize New Perspectives as a sham -- what Kerr (1990) called "glossy dogma to hide old habits."

Shepard (1990) argues that "old forestry" failed because it continued to stress timber primacy, localization of authority, and scientific-rational solutions in an era when those orientations had become political liabilities. While New Perspectives implies a rejection of timber primacy, and an acknowledgement of urban concerns as well as rural ones, Shepard predicted that acceptance within the agency would be difficult because New Perspectives -- and by extension, ecosystem management -- goes against the grain of 100 years of Forest Service history, challenges the scientific-rational paradigm, and adds the awkward (to foresters) elements of values and interests to an already complicated managerial setting.

There is evidence that Forest Service personnel are undergoing the same change in environmental value systems as the nation as a whole. Surveys of Forest Service employees by Brown and Harris (1992) provided strong evidence that attitudes have shifted toward the so-called New Environmental Paradigm (Catton and Dunlap, 1980) as older, traditionalist line officers retire and are replaced by younger, more idealistic resource managers. Perhaps the most visible evidence of this change is the rapid rise of the reformist Association of Forest Service Employees for Environmental Ethics (AFSEEE).

Yet this does not imply a rejection of the scientific-rational paradigm, but an acceptance of the idea that the problems to be addressed are more complex than was previously believed, and that managed systems contain human and biological components which previous generations of foresters ignored. Thus the jury is still out on the fate of

ecosystem management within the agency. As Shepard (1990) suggests, the acceptability of a new orientation within the Forest Service will depend upon the relative strengths of traditional agency values versus the environmental values of newer employees.

Gale (1991) developed a framework for predicting responses to ecosystem management within communities where the forest is the basis for the local economy. He suggested that ecosystem management would change human activities in forests by increasing the variety of forest products available, the variability of scales of forest activities, and the labor-intensiveness of management, and also by changing the accessibility and visual appearance of forests.

Acceptability of those changes within different types of communities would depend on the nature of the dependency. In mill towns, then, new methods may be seen as a threat to traditional ways of life, or they may be embraced for offering economic diversification opportunities and a means of preserving traditional lifeways in the face of preservationist pressures. In tourist towns, acceptability may depend on the visual quality of the particular practices used. In recreation residential communities, ecosystem management is likely to be harshly viewed from "a limited, protectionist, forest-as-backyard perspective."

Factors influencing public responses

Knowledge about ecosystem needs. Public attitudes toward ecosystem management are likely to be relatively favorable if it is widely understood that the practices are intended to improve our ability to preserve biological diversity and maintain long-term viability of forest ecosystems. Dunlap (1991) reported that public concern for environmental quality

reached unprecedented levels in the late 1980s. "Preserving biodiversity" has become the sort of apple-pie-and-motherhood objective that "fighting poverty" was in the mid-1960s: It may be hard to find anyone who's against it, but there's a huge amount of disagreement over the means of achieving it.

There is empirical evidence that otherwise unappealing resource management practices can gain some amount of public acceptance if employed to achieve desired goals. Brunson (1991) found that that acceptability judgments of some (but not all) New Perspectives conditions were significantly higher among evaluators who were first told the purpose of the practices being used. The change in ratings had the effect of moving an otherwise unacceptable practice, a partial harvest with created snags and retention of large woody debris, to a neutral level. Similarly, Taylor and Daniel (1984) found that people who understood the ecological benefits of fire were more likely to approve of managers' use of it, although they still preferred to not to see fire used in places they personally planned to visit.

Biocentrism and the scientific-rational paradigm. Counteracting this tendency to some extent will be beliefs about the culpability of foresters for current ecological problems and the ability of new technologies to make a positive difference. If one agrees with Devall and Sessions (1985) that human interference with the natural world is already too great, active ecosystem management is unlikely to be preferred over "silvicultural silence." Any attempt by humans to tinker with nature may be seen as an invitation to further disaster. Thus Kerr (1990) reacted to Franklin's (1989) description of ecosystem management as a "kinder, gentler forestry" by calling the New Perspectives initiative a "kinder, gentler form of rape."

Yet biocentric viewpoints do not lead inexorably to this sort of rejection of the scientific-rational paradigm. We might also see more people subscribing to the view of Ramel (1992), who believes *Homo sapiens* is too successful as a species to step aside from the responsibility to actively set things right, and that it is "wishful thinking" to classify humans as comparable to other species. Ramel argues that the success of the human species comes from its incredible evolutionary adaptability, and that it is through adaptability that a solution must arise:

"The development of human civilization more and more requires that natural ecological control mechanisms are replaced by human artificial controls, and inevitably the result will be ecological surprises and occasional ecological disasters. ... It remains to be seen whether human intellect and adaptability will be sufficient to avoid future environmental catastrophes in the tracks of cultural evolution."

Ecosystem management can be characterized as an attempt at cultural adaptation -- in effect, to "evolve" a new way for society to interact with its environment. Even among the most pessimistic observers, it may be seen as a last-ditch attempt to avert catastrophe.

Fitting ecosystem management into a world view. Related to the issue of attitude change is that of cognitive consistency -- people are likely to try to express viewpoints that appear consistent with their other beliefs (Festinger 1957, Bem 1967). Van Liere and Dunlap (1983) report that the strength and stability of belief in the New Environmental Paradigm depends on an individual's ability to organize any conflicts with other beliefs into a consistent cognitive framework. For example, an individual must be able to resolve seeming incompatibilities between belief in the American free-market system and a viewpoint that there should be limits to economic growth.

Similarly, the acceptability of the ecosystem management philosophy will depend on how the evaluator categorizes it within the larger framework of ideas concerning resource management: Is it perceived as a reflection of President Bush's belief that a sound ecology and strong economy are complementary (USDA Forest Service, 1992), or as a reflection of Leopold's (1949) belief that the needs of humans must be subservient to the needs of ecosystems? Although those viewpoints may seem contradictory, ecosystem management has been claimed by adherents of both.

Attitudes of field tour participants

This study offered an opportunity to measure attitudes toward New Perspectives silviculture among diverse groups who attended the field tours. Some of those results have already been presented (pp. 38-40) as a way to describe the study sample. This section goes into greater detail, focusing on how differences in attitudes toward ecosystem management are related to the ways people use and perceive forests. Attitude indicators included responses to 12 Likert-type items measuring participants' pre-tour beliefs about New Perspectives practices and ideals, and three post-tour questions which measured attitudes, preferences, and likelihood of support for New Perspectives. Variability in responses was evaluated in terms of respondents' levels of prior knowledge about New Perspectives, their identification with environmental advocacy groups, and the occupational/organizational role that led to their participation in the tour. Previous research has shown that those characteristics are likely to influence reactions to forest practices and conditions (e.g., Becker 1983, Ribe 1989).

Pre-tour beliefs about New Perspectives. The pre-tour scales asked participants to agree or disagree with statements about "New Forestry," a term chosen for its wider recognizability. Respondents were asked to skip the items if they knew nothing about New Perspectives. Included were six descriptive statements covering aspects of the New Perspectives philosophy, and six belief statements. Descriptive items were chosen from articles and Forest Service internal publications. They differed primarily in the ways that they expressed the goals of ecosystem management, and were intended to measure whether some conceptualizations of New Perspectives are more readily accepted than others. The belief statements came from an open-ended survey mailed to participants in an earlier field tour sponsored by the Western Forestry and Conservation Association (Brunson 1990).

Percentages of respondents who agreed or disagreed with the 12 statements are shown in Table 12. As one might expect, a majority agreed with each of the descriptive statements, which were relatively content-neutral conceptualizations of New Perspectives. The items receiving the least amount of agreement referred to its ecological "appropriateness," and its focus on biodiversity in "forests of any age."

In general, responses to the descriptive statements were not affected by politically relevant characteristics of respondents. Chi-square tests for comparison of frequency distributions found that prior knowledge about New Perspectives was associated with responses to one of the six statements: People who said they "know a lot about New Forestry" were disproportionately likely to disagree with the statement that "New Forestry increases emphasis on interrelationships among elements of forest ecosystems" ($\chi^2=11.5$, $p<.05$). Environmental group identification likewise had little influence, except that avowed

TABLE 12: Pre-tour dispositions toward New Perspectives conditions and philosophy^a

<u>Statement</u>	<u>Disagree</u>	<u>Neutral</u>	<u>Agree^b</u>
New Forestry ^c is to manage holistically, evaluating each activity as only part of the whole.	10%	24%	66%
New Forestry involves greater concern for integrating social values in management decisions.	14%	16%	70%
New Forestry increases emphasis on interrelationships among elements of forest ecosystems.	7%	15%	78%
New Forestry means maintaining a broader outlook on what forests can and should provide.	9%	16%	75%
New Forestry emphasizes the ecological appropriateness of forest management practices.	17%	22%	61%
New Forestry is a way to manage for biodiversity in forests of any age.	10%	29%	61%
New Forestry is a jumble of trees, snags, and windfall -- a powder keg waiting for a spark.	60%	23%	17%
New Forestry is a way to preserve the spotted owl while still allowing some timber harvest.	26%	37%	37%
New Forestry will curtail timber supplies, eliminate jobs, and raise lumber prices.	37%	30%	33%
New Forestry is just sloppy clearcuts with theoretical benefits to wildlife.	52%	30%	17%
New Forestry is being used as an excuse to log the last roadless areas.	73%	17%	9%
New Forestry is an attempt to appease critics and lessen the sentiment against public forest management that has been generated by environmental activists.	19%	28%	53%

^aThe first six items are descriptive statements, the second six are belief statements.

^bResponses are condensed from a five-point scale where 1=strongly disagree, 2=agree, 3=neither agree nor disagree, 4=agree, 5=strongly agree.

^cThe term "New Forestry" was used to reflect its dominance in both the popular and professional forestry media.

non-supporters of environmental groups were more likely to disagree that "New Forestry is to manage holistically, evaluating each activity as only part of the whole" ($\chi^2=18.2$, $p<.01$). Occupational/organizational role was associated with responses to two statements: Those who participated as environmental activists or "others" (mostly non-foresters who took part in tours arranged by environmental groups) were more likely to respond neutrally to the statement about increased emphasis on interrelationships between ecosystem components ($\chi^2=20.8$, $p<.05$), and industrial foresters were more likely to disagree that New Perspectives emphasizes "ecological appropriateness" ($\chi^2=21.7$, $p<.05$).

Responses to the six belief items showed that the tour participants tended to agree that New Perspectives silviculture is intended to ease pressure from environmental interests, and to disagree that it is a threat to forest health, "is just sloppy clearcuts," or is an excuse to log roadless areas. There were wide disparities of opinion about statements that New Forestry offers a possible avenue of compromise in a jobs-vs.-owls debate, and that it will "curtail timber supplies, eliminate jobs, and raise lumber prices."

There was no relationship between knowledge about New Perspectives and any of the belief items. Environmental group members were more likely than non-members to agree with the statement that "New Forestry is being used as an excuse to log the last roadless areas" ($\chi^2=26.8$, $p<.001$). Occupational/organizational role had a significant influence on responses to five of the six items. Industry foresters were disproportionately likely to agree that New Perspectives stands are "a powder keg waiting for a spark" ($\chi^2=24.1$, $p<.01$) and that New Perspectives will adversely affect the timber economy ($\chi^2=19.2$, $p<.05$), and they were more likely to disagree that New Perspectives offers a way to save the spotted owl

while allowing some timber harvest. Non-foresters were more likely to agree with the latter statement, and also to agree with the statement about logging roadless areas ($\chi^2=20.8$, $p<.05$). Both industry foresters and environmental activists were disproportionately likely to consider New Perspectives stands "just sloppy clearcuts," while other non-foresters were especially likely to disagree with that statement ($\chi^2=29.7$, $p<.01$).

Post-tour attitudes. Results reported in Chapter 3 showed that 58% of respondents felt positively or very positively about New Perspectives, compared to 8% who felt negatively or very negatively. Only 10% felt New Perspectives silviculture is less appropriate than traditional practices for Northwest forests overall, although another 22% said New Perspectives is better in some ways but also worse in some ways. Two-thirds would be likely to support using New Perspectives silviculture on public forests.

As in the previous analysis, responses to the attitude questions were cross-tabulated with responses to politically relevant characteristics of respondents. (In this case, only the influences of environmental group identification and tour role were examined, since participation in the tour was likely to have smoothed over any differences associated with prior knowledge about New Perspectives.) Chi-square analyses were again performed to test for differences in response frequencies associated with personal characteristics.

Identification with environmental groups was associated with the preference for New Perspectives over traditional practices, but not with overall attitude nor with likelihood of support (Table 13). Even environmentalists who don't care for ecosystem management prefer it over traditional practices, and would support using it on public forest lands (even though they may also consider it an excuse to log the last roadless areas).

TABLE 13: Cross-tabulation, post-tour judgments of New Perspectives X level of environmental activism/support

	Non-member <u>No support</u>	Non-member <u>May support</u>	Member <u>Not active</u>	Member <u>Active</u>	
<u>Overall attitude</u>					
Positive	47%	57%	67%	60%	$\chi^2=1.49$
Negative	13%	8%	7%	7%	ns
Mixed	40%	35%	27%	33%	
<u>Comparison of approaches</u>					
Prefer New Perspectives	20%	30%	47%	87%	$\chi^2=22.8$
Prefer traditional	7%	14%	13%	--	$p=.029$
Prefer both equally	20%	19%	13%	--	
Depends on situation	40%	27%	7%	7%	
Not sure	13%	11%	20%	7%	
<u>Support use on public land</u>					
Likely	60%	70%	64%	73%	$\chi^2=8.33$
Unlikely	7%	8%	14%	--	ns
Depends on location	33%	22%	14%	27%	
Not sure	--	--	7%	--	

TABLE 14: Cross-tabulation, post-tour judgments of New Perspectives X roles of tour participants

	Public <u>Forestry</u>	Industrial <u>Forestry</u>	Research/ <u>Teaching</u>	Student	Envir. <u>Activist</u>	Other ^a	
<u>Overall attitude</u>							
Positive	78%	28%	67%	85%	50%	80%	$\chi^2=25.6$
Negative	--	24%	--	--	--	--	$p=.004$
Mixed	22%	48%	33%	15%	50%	20%	
<u>Comparison of approaches</u>							
Prefer New Forestry	33%	10%	56%	54%	100%	100%	$\chi^2=55.3$
Prefer traditional	--	28%	--	--	--	--	$p<.001$
Prefer both equally	33%	17%	11%	--	--	--	
Depends on situation	22%	38%	11%	15%	--	--	
Not sure	11%	7%	22%	31%	--	--	
<u>Support use on public land</u>							
Likely	83%	41%	75%	85%	75%	100%	$\chi^2=28.2$
Unlikely	--	17%	13%	--	13%	--	$p=.02$
Depends on location	17%	41%	13%	15%	13%	--	
Not sure	--	--	--	--	--	--	

^aIncludes non-foresters identifying themselves as journalists, farmers, lobbyists, corporate finance officers, or "citizens."

Occupational/organizational role was a much better predictor of post-tour attitudes toward New Perspectives, being significantly associated with all three variables (Table 14). All of the persons who held negative attitudes were industrial foresters, as was everyone who preferred traditional methods to New Perspectives practices. Privately employed foresters were also significantly less likely to support the unqualified use of New Perspectives practices on public forests.

Foresters who work with public agencies were no less likely than non-foresters to feel positively toward New Perspectives, and no less likely to support the use of New Perspectives on public lands. However, they were reluctant to express a preference for New Perspectives silviculture over traditional practices, tending instead to say that the two approaches were equally suitable, or that both have disadvantages and advantages.

Variation in issues and concerns

Professional roles and interest group identifications also influenced the kinds of issues people raised about New Perspectives practices and conditions. These influences were examined via a qualitative analysis of responses to the open-ended questions on the tour questionnaire. For each of the six open-ended questions on the survey, responses were first categorized using a constant comparison technique (Glaser and Strauss 1967). Attributes of persons who mentioned each issue were then examined for common elements. Response frequencies were noted to ensure that potentially relevant characteristics weren't linked to issues simply by chance, but no strict numerical decision-making rule was applied. The emphasis here was on finding "disproportionalities" in responses useful for theory-building

and drawing preliminary conclusions. A confirmatory quantitative study is needed to assess the relative strength or prevalence of reactions within any particular interest group.

Reactions to individual tour stops. Positive and negative responses to tour stops (listed in Table 8, p. 39) were often a function of the presentation, rather than the condition or practice seen. Positive reactions were most likely to be attributed to: a progressive approach toward forestry; protection of biodiversity; an attempt to find a balance between competing interests; or preservation of future options. The first two of those did not seem to be associated with any particular kind of respondent, although biodiversity was especially important to persons with a natural science educational background. The latter two reasons were associated with non-foresters. Active environmentalists tended to stress preservation of options, while the political "balance" issue attracted non-activists who were favorably disposed toward New Perspectives, (e.g., college students). Foresters tended to choose reasons specific to their profession, such as the fact that silvicultural objectives were met.

Negative reactions showed a clearer pattern. Uncertain outcomes, scientific gaps, and unclear objectives led to negative reactions by forestry professionals. Practical issues such as regeneration also was associated with negative reactions by foresters. Environmentalists almost invariably objected that New Perspectives is still too timber-driven. Other non-foresters rarely reacted negatively, but of those who did, timber orientation was the most common complaint.

Aspects of New Perspectives liked most. Statements about the positive aspects of New Perspectives silviculture were placed in four broad categories: general statements about the New Perspectives philosophy, statements about silviculture and operations, statements

about ecosystem components, and statements about societal issues (see Table 9, p. 41). The general statements tended to stress the scientific progress and problem-solving aspects of New Perspectives. Not surprisingly, given the scientific-rational orientation of resource professionals, statements in this category came mostly from foresters. Within the silviculture category, environmentalists and college students often chose statements that compared New Perspectives silviculture favorably with traditional practices. Foresters tended not to choose statements in this category, presumably because they were generally comfortable with the traditional methods, although the New Perspectives focus on landscape-level planning and management did appeal to some foresters.

Statements about ecosystems were the most common of all, and they came from everyone. Industrial foresters and those with negative attitudes, if they could find any good points about New Perspectives at all, were most likely to choose statements in the ecosystem category. Statements about social aspects of New Perspectives were made by non-foresters, and, to a lesser extent, foresters who appreciated the potential public relations benefits of adopting New Perspectives management systems.

In general, non-foresters and environmental group members tended to focus on the "natural" aspects of New Perspectives silviculture -- for example, the increased emphasis on mimicking natural disturbances -- or else on the position that it occupies on a politically defined spectrum from total preservation to total utilization. Non-environmentalists and foresters tended to stress the fact that New Perspectives is science-driven, or else its benefits to politically or recreationally important wildlife. Agency foresters also were pleased that public opinion is given more emphasis in a New Perspectives management framework.

Aspects of New Perspectives liked least. The same categorization scheme was used to classify aspects of New Perspectives silviculture that respondents liked least (see Table 10, p. 42). Objections of a general nature tended to focus on issues of risk and uncertainty, i.e., a perceived lack of scientific grounding or concrete objectives, and the speed at which New Perspectives is being adopted. Such objections were most likely to come from foresters with advanced degrees and those in administrative positions. Other foresters -- those who hold bachelor's degrees, and still work in the woods -- were the source of most complaints about on-the-ground applications of New Perspectives such as safety, blowdown, loss of salvage opportunities, and regeneration challenges.

The ecosystem aspects of New Perspectives drew only four complaints, all from environmentalists who believed that a better approach would be do no manipulation at all. Societal concerns were raised mainly by persons who disapprove of New Perspectives (i.e., privately employed foresters) who objected to costs, appearance, and the credence given to opinions of non-professionals.

Almost half of the negative responses could be characterized as complaints about the position of New Perspectives along a continuum from traditionalism to preservationism. For example, there were four responses saying that too many trees had been retained, and seven that not enough trees had been retained. Those who believe New Perspectives has strayed too far from traditional forestry slightly outnumbered the group who said it hasn't gone far enough. Environmental group members fell entirely into the latter category, while the former group included all but one of the privately employed foresters. Students and public foresters were more likely to say it's too traditionalist than to say it's too preservationist.

Most memorable aspects of research/demonstration sites. Because first impressions of "new" forest conditions are likely to have a major impact on overall public reactions, survey respondents were asked to indicate what they would remember most about each tour stop (see Table 11, p. 44). These were categorized by their "pervasiveness," i.e., the extent to which reactions were expressed by persons in more than one tour group and/or at more than one location. The most pervasive reactions were associated with the practical applications of New Perspectives silviculture in the short and long term, uncertainty about eventual results, and aesthetic impacts.

Reactions to practical, stand-level aspects of New Perspectives implementation (e.g., the number of snags retained) were not associated with a particular group. However, other aspects of the silviculture or the science -- e.g., levels of uncertainty, or long-term objectives -- were mentioned mostly by foresters and/or persons who felt ambivalently or unfavorably toward New Perspectives. Aesthetic issues were raised by two distinct groups of respondents: industry foresters, who tended to prefer traditional practices and believe New Perspectives stands look worse ("sloppier"); and persons with little or no forestry background, who found the stands unattractive yet preferred them over clearcuts. Wildlife benefits and the "naturalness" of New Perspectives stands were noted primarily by non-foresters. Foresters were most likely to mention issues of safety and cost.

Non-foresters never mentioned the economic effects of New Perspectives silviculture. This finding could be interpreted in two ways: Either non-foresters did not recognize that costs would be incurred, or they did not feel that the potential cost increases were especially memorable. The latter reason is more plausible. It is hard to believe that the economic

implications would escape anyone who was interested enough in forestry issues to spend the day on a New Perspectives field tour. Part of the apparent disinterest may be due to the fact that the negative economic impacts will be concentrated in timber-dependent communities and a few industries. But there also is ample evidence that Americans are willing to pay to preserve forests (including the study described in Chapter 5 of this report). Public agency foresters didn't mention economic concerns very often, either. Presumably this is because the more memorable aspects of the tours were ones that were more directly relevant to their jobs -- either applying New Perspectives on the ground, or else coordinating between the field personnel who tend the forest and the public who own it.

Requests for further information. Respondents were asked after each tour stop if there were topics that they wished they'd heard more about. No further information was requested on two of the tours (Oregon Native Plant Society, and Eugene Sierra Club), so the vast majority of responses came from foresters or college students. Foresters who work for private industry -- especially those with unfavorable attitudes toward New Perspectives -- were most likely to want to hear more about economic costs or worker safety. Foresters from public agencies wanted to know about silvicultural objectives or landscape-level management. Non-foresters were disproportionately likely to ask about biodiversity issues or the role of public opinion in management.

Additional comments or concerns. The final question at each tour stop was entirely open-ended, simply asking respondents if there was anything else they wanted to say about that location. There were 43 such comments, which were placed in five broad categories: concerns about lack of information; general criticisms or cautions; general expressions of

praise; statements questioning the basic assumptions of New Perspectives; and suggestions for improvement. Favorable statements came only from environmental group members (a few of whom also worked for public forestry agencies). Statements questioning the assumptions behind New Perspectives were divided evenly between ones from persons who saw little need for a "new" forestry, and ones from persons who saw little need to harvest timber from public forests at all. The remaining comments -- all from foresters -- were mostly repetitions or rephrasings of concerns expressed elsewhere in the survey.

Conclusions

The people who attended the field tours can be classified into four distinct groups: industrial foresters, agency foresters, environmental activists, and interested laypersons. If one arranged those groups along a spectrum from full utilization to full preservation, support for ecosystem management is most likely to come from those "in the middle" -- agency foresters and the non-activist public -- although all four groups found things to criticize.

The "new perspective" that the public finds most acceptable may not be the same one the Forest Service adopts. As Vining and Ebreo (1991) showed, the middle ground occupied by the Forest Service is not necessarily the same middle ground occupied by the public. It nonetheless appears that a significant portion of the public will see ecosystem management as a socially acceptable compromise which adjusts Forest Service priorities without abandoning the foundations of multiple use. However, movements and countermovements will keep up their intense scrutiny of the Forest Service, and it would be naive to suggest that ecosystem management can entirely cure what Gale (1992) has called its "agency ulcers."

5. Using Data Visualization Methods to Assess Social Acceptability

Elsewhere this report has suggested that if forest landowners fail to understand the social context of their activities, they may suffer significant consequences in terms of restrictive and prescriptive legislation. The need to address public dissatisfaction with forestry practices has been recognized by a number of forest management entities, both public and private. One of their responses has been to experiment with various aspects of ecosystem management. Yet as we have seen, elements of ecosystem management practice may be viewed negatively even by those who endorse the ecosystem management philosophy. The last thing an agency or owner wants to do is replace a disliked practice with one that is even more disliked. Forest managers therefore have a stake in being able to gauge public reaction to a particular application of ecosystem management *before* it is implemented.

New forestry practices can produce previously unknown forest conditions. In order to judge their appropriateness, affected publics must be able to understand the probable impacts of the new conditions over relevant time periods. Problems arise when information about those impacts is presented in a form that is not equally accessible to all participants. Descriptions of silvicultural impacts can be expressed in terms of clearcut acreage, board foot volumes, or tons of woody debris. While familiar to foresters, these terms may mean nothing to large segments of the public. Managers need ways to convey information to persons untrained in forestry.

Photographs and demonstration areas offer obvious benefits for transcending differences in information and knowledge. But generic photographs of logging sites may

lack the local context necessary for lay persons to evaluate impacts, and local demonstration sites are undesirable if the resulting impacts turn out to be unacceptable. An alternative approach is to use computer-driven data visualization methods such as "image-capture" technology (ICT) which can simulate scenic impacts before they occur (Daniel 1992).

It is important to know the capabilities and limitations of such technologies for evaluating acceptability of future forest conditions. This chapter describes some of those capabilities and limitations, as demonstrated in a pilot study⁹ that used photo simulations to measure the impacts of alternative harvest practices on scenic quality of homesites adjacent to the Oregon State University research forest.

The problem: Scenic quality at the urban/forest interface

The pilot study was designed to address questions relevant to the issue of conflict at the urban/forest interface. Continued expansion of towns and cities is bringing residential development to the edges of managed forest lands, where new neighbors often object to the traditional forest management activities taking place on adjacent properties. A recent survey of forest managers found that urban/forest interface conflicts were seen as one of the top emerging issues in forestry (Jakes *et al.* 1990). Means to reduce or avoid such conflicts are needed. Accordingly, a study was undertaken to see whether computerized photo simulation technology could be of use in reducing or predicting conflicts associated with scenic quality at the urban/forest interface.

⁹Complete details of the study can be found in Kimura (1992).

Many urban/forest interface conflicts fall into the category of environmental disputes known as NIMBY (not in my backyard). Often highly intense and emotional, NIMBY protests occur when environmental costs of a proposed project are geographically concentrated and the benefits are largely realized elsewhere (Kraft and Clary 1991). Costs may include health or safety risks, reductions in environmental quality, or reduced property values. In forest management, NIMBY disputes tend to focus on adverse scenic impacts, use of prescribed fire, herbicide application, or other consequences of intensive silviculture.

NIMBY disputes are politically potent, and can rapidly expand from local protests to regional movements (Lee 1991). Private forestry operations in rapidly urbanizing areas may be especially vulnerable to such protests because managers often lack political experience, and the new rural migrants tend to arrive with formidable political and communications skills (Fortmann and Kusel 1990). Thus the end result of conflict at the urban/forest interface is often a change in practices by a somewhat unwilling landowner.

Strategies to resolve urban/forest interface conflicts can be categorized into three types: information and education; cooperative action; and land acquisition and protection (Cortner 1991). Examples include the participation of forest industries in environmental education programs, establishment of citizen advisory panels, and purchases of conservation easements (respectively). An objective of all three strategies must be to ensure that all participants are kept informed about the impacts forest management can have on a variety of values. Unless all sides operate from the same information base, longterm goals for conflict resolution are unlikely to be met.

Image-capture technology

Image-capture technology (ICT), also known as image-processing technology or video-imaging, is a mechanism for visually simulating impacts of land use. It has been used or proposed for use in public involvement and planning processes, as well as in predictive models of changes in visual resources. As Bishop and Hull (1991) wrote, this technology "gives the project designer a canvas on which to work towards more beneficial visual impact and provides the mechanism for communicating those changes to the public."

The simulation process involves the computer "capture" of a video or film image, manipulation of that image using computer paint and image-processing software, and output of the altered image to a monitor, videotape, print, or slide. The resulting images can have a number of applications in planning and research relating to architecture, landscape design, environmental impact assessment, and natural resource management.

Examples of uses in natural resource management include: predicting and comparing visual impacts of proposed highway, powerline, or other developments (Chenoweth 1992); evaluating environmental and visual tradeoffs of differing levels of attack on defoliating insects (Lynch and Twery 1992); measuring public preferences for conditions of wilderness settings (Nassauer 1990); and predicting the aesthetic and recreation use effects of natural forest disturbances (Hollenhorst *et al.* 1991). Series of images simulating the development of a forest stand over an extended time period are able to provide information that cannot be seen from photos of existing conditions, and may elicit preferences for different silvicultural systems (Lynch and Twery 1992). Soon ICT simulations may be integrated with GIS (Host *et al.* 1992) or forest growth and succession models (Burkhardt 1992).

In the context of the urban/forest interface, simulations produced through ICT hold promise for use in all three of Cortner's (1991) interface management strategies:

- Information and education: ICT photos may be included in standard environmental education curricula, developed for use in public involvement sessions, or employed in landscape assessment research projects (Bishop and Hull 1991).

- Cooperative action: ICT photos can guide efforts to negotiate and write a mutually agreeable harvest plan that produces profits for industrial foresters while retaining a visual resource that is acceptable to neighbors.

- Acquisition and protection: ICT photos can be incorporated in legal documents which define performance standards for developers or set the bounds of allowable visual impacts (Chenoweth 1992). And they can be combined with economic valuation techniques to assess consequences of environmental damage or establish prices for protective easements.

In the pilot study, ICT-generated photographs were shown to homeowners living in an interface neighborhood adjacent to a forest managed for research, education, recreation, and timber production by Oregon State University's College of Forestry. Slide photos simulated the view from residents' own homes if various silvicultural regimes were used on the adjacent forest. The study had two objectives: (1) to evaluate the utility of ICT for displaying possible impacts of timber management in a specific locale; and (2) to determine whether adjacent landowners would express willingness to pay for scenic easements that would provide several levels of protection against clear-cutting on a timber-producing forest adjacent to their homes.

Backyard scenic beauty and its protection

Assessments of near-view scenic quality are generally made by asking survey respondents to judge actual or photographed scenes using a comparison procedure or a unidimensional scale. Many of the world's commercial forest types have been studied in this fashion (e.g., Brown and Daniel 1986; Hull and Buhyoff 1986; Savolainen and Kellomäki 1981). In one of the few studies conducted at the urban/forest interface, Vining *et al.* (1984) found that the presence of dead pines or slash piles detracted from scenic quality, while distant views were the most positive predictor of beauty. The visibility of residences detracted from scenic beauty only if the houses were judged to be incongruous in their surroundings, but outbuildings had consistently negative impacts.

Clearcutting, the predominant silvicultural system in western Oregon, produces stands that are usually judged less scenic than partial harvests, although small clearcut units may be compatible with aesthetic quality in some settings (Burde and Lenzini 1982; Brunson and Shelby 1992a). Scenic quality is generally lowest right after harvest, but can recover rapidly in a few years after logging (Hull and Buhyoff 1986). Intermediate treatments such as thinning or prescribed fire have varying effects depending on the extent to which they create other conditions associated with low scenic quality, such as bare ground (Ribe 1989).

These findings may better reflect judgments by forest recreation visitors than adjacent residents, because survey sampling in scenic beauty studies is normally intended to elicit ratings for a general population. Residential scenic quality at the urban/forest interface may be more sensitive to changes in environmental conditions. Recreation research shows that visitors are more critical of timber harvests in "special places" to which the recreationists are

emotionally attached (Mitchell 1989; Martinson and Baas 1992). Reactions to backyard timber harvest are likely to be even more critical, because the emotional cost of aesthetic degradation due to timber harvest is reinforced by the potential economic cost if property value is reduced. Thus scenic value has an economic aspect as well as an aesthetic one.

Attempts to estimate the economic value of scenic quality have taken three forms: contingent valuation studies of forest beauty or quality which have generally focused on benefits to a larger society (Walsh *et al.* 1989, 1990); contingent value or travel cost studies focusing on the contribution of scenery to recreation experiences (Daniel *et al.* 1989; Brown *et al.* 1989); and hedonic approaches seeking to determine the contribution of scenery attributes to market price or consumer surplus (Magill and Schwarz 1989; Englin and Mendelsohn 1991; Garrod and Willis 1992). All of these studies have found that measures of scenic quality were strongly and positively associated with measures of economic value.

Paradoxically, scenery may be more valuable to those who don't own it. Scenery is a nonexclusive good because it is difficult to keep non-owners from enjoying it. It is non-rival in consumption, because the value of scenic viewing for any one person is not diminished by the number of persons enjoying it (up to the point of congestion). And because scenery is most often viewed from someplace other than the scene itself, owning a scenic vista may provide mainly non-market values (e.g., knowing one possesses an object of beauty) while neighboring landowners obtain market value from owning a good vantage point.

One way for owners to capture the market value of their vistas is by means of a scenic easement. Under such an arrangement, an owner sells, donates, or leases the development rights to a property while retaining ownership of the land (Bradley 1984).

Scenic easements typically are employed where scenic quality is perceived to be scarce relative to growing demand, as may be true at the urban/forest interface. By ensuring that a viewshed will not be used for purposes likely to degrade scenic quality, landowners are employing a strategy that falls into Cortner's (1991) category of "acquisition and protection."

Homeowners may be willing to pay to maintain their backyard scenery to increase the value of their property, or they may simply gain enjoyment from the view. When asked their willingness to pay to maintain scenery, homeowners are likely to take into account all of the ways that the scenery is valuable to them. It doesn't matter if different homeowners value the scenery for different reasons, because the monetary measure provides a common metric or yardstick for estimating the total value (Johnson and Brown 1991).

The McDonald Forest neighbor study

The Oregon State University research forest, commonly known as McDonald Forest, offers a classic example of how forest management can become more complex as a result of urban expansion. In 1990, a brief NIMBY protest occurred after an experiment on ecosystem management techniques (McComb *et al.* 1992) was undertaken in stands adjacent to a residential neighborhood. Conflict was reduced when the forest's managers began an active information/education program regarding harvest activities, and agreed to maintain an uncut buffer between the research site and adjacent property boundaries. Because of the controversy there was considerable interest by the OSU College of Forestry in discovering the value of scenic beauty at the urban/forest interface (although as a state agency the university has neither the authority nor the intention to initiate an easement program).

The ICT study began in summer 1991, about a year after the initial protest, when the scenic protection issue was still quite salient to neighboring residents. Study participants were first sampled by first identifying 50 households through tax lot information and on-site observation. Most of the residential lots abutted the OSU research forest, although the forest adjoining a few lots was owned by commercial timber companies. Of the original 50 households, 12 were eliminated from the study because of technical constraints or owners' refusal to allow a photograph to be taken. Photographs were taken at the remaining 38 home sites. Slides depicted a portion of the home plus a view of the adjacent forest, as seen through a 35mm (wide angle) lens. The software program Lumena (Time Arts Inc. 1990) was then used to produce four simulated scenes for each household, each showing a different level of timber harvest in the adjacent forest.

Simulations involved replacing the mature forest shown in the original slide with images of existing timber harvest units located on the OSU forest. Harvest practices shown were: (a) traditional clearcutting in units of 5-20 ha; (b) commercial thinning of trees in the small sawtimber (35-50 cm dbh) condition; (c) group selection, in which one-third of the timber volume was removed in 0.2 ha patches; and (d) two-story harvest, in which two-thirds of the timber was removed, leaving behind 8-10 large trees per acre plus standing dead and down wood. Practices (c) and (d) are experimental methods being developed to improve protection of biological diversity and long-term site productivity in Douglas-fir forests. All harvests had taken place in 1989 or 1990 except the thinning, done in 1985. Different views of harvest units were sometimes used in the simulations to adjust for differences in house and lot configuration.

Surveys were administered in participants' homes. Personal interviews were conducted with 41 adults in 29 homes, or 76% of the properties where photographs were taken. Non-response was due primarily to time conflicts that made it impossible to schedule in-home interviews during the survey period (January-March 1992). Median property size was 0.6 ha, and the median length of the property boundary with adjacent forest was 120 m. Participants had lived in their homes for a median length of 8 years, and 71% intended to live there indefinitely. Eighty-eight percent considered living next to a forest "important" or "very important." Slightly more women (56%) than men participated in the study.

In each interview, participants first answered a series of questions about themselves, their homes, and their beliefs about management of the adjacent forest. They were then shown slides of clearcuts, thinned stands, group selection stands, and two-story stands in an unspecified forest setting. Respondents judged the scenic quality of two views of each practice, using a nine-point Likert-type scale from -4 (most unacceptable) to +4 (most acceptable). This scale, developed by Brunson (1991), differs from traditional scenic beauty estimation measures (e.g., Brown and Daniel 1986) in that it is centered about a neutral point. A mean rating below zero indicates that a practice is largely viewed as a scenic detriment, while a positive rating indicates that a practice is largely acceptable.

Next respondents were shown simulated views of the same practices as seen from their backyards, and asked to make a second acceptability rating. After those ratings, respondents were asked about their willingness to pay for a scenic easement that would require the adjacent forest landowner to employ some practice other than clearcutting within a 100-by-200-foot buffer along their property line. Four types of easements were proposed.

One would have prevented harvest altogether; each of the others would allow one of the three less intrusive harvesting methods (thinning, group selection, two-story) to be done.

Prices for scenic easements were estimated from the opportunity costs that a commercial forest owner would incur. Currently the most cost-effective way to harvest these stands is through clearcutting. Since a scenic easement would require the forest landowner to use some other method (group selection, thinning, or two-story), or not to harvest at all, the payment would have to compensate the forest owner for the profits foregone. A scenic easement which resulted in no harvest would cost the forest landowner the entire value of the timber, and therefore is the most expensive. The easements which would allow an alternative harvesting method would be less expensive because the forest landowner could still gain some revenue from the harvest of trees. The price of each easement was calculated as the difference between what the forest landowner would have received from clearcutting and what would be received through each of the other methods¹⁰. The prices calculated using this procedure were: to maintain a patch cut, \$110/year; to maintain a two-story stand, \$130/year; to maintain a thinned stand, \$190/year; to maintain a mature forest, \$350/year.

The four willingness-to-pay questions were asked in numerical order, beginning with the lowest price. Because of the small sample size, all respondents were asked to consider the same price rather than a range of potential prices, as would be done in a traditional

¹⁰Assumptions about future harvests were based on typical clearcutting and thinning regimes on nearby industrial forest lands, and on proposed silvicultural prescriptions for the experimental two-story and group selection systems. Prices were estimated by calculating growth rates from an average current timber volume of 150,000 board feet per hectare, at \$300 per 1,000 board feet and a real interest rate of 4 percent. Estimates were made with the assistance of J. Douglas Brodie, Department of Forest Resources, Oregon State University.

dichotomous-choice contingent valuation survey (Mitchell and Carson 1990). The intent here was not to estimate consumer surplus or total benefit for any general population, but simply to assess willingness to pay a hypothetical but realistic market price for an easement in a particular case at the urban/forest interface.

Study results

Table 15 shows the mean ratings for each practice in the unspecified and backyard settings. Also shown are the percentage of respondents in each case who rated the scene in the "acceptable" range (i.e., gave ratings of 1, 2, 3, or 4).

When the location of the stand was not specified, thinning was acceptable to nearly every respondent, while the clearcuts were unacceptable to a large majority of users. The experimental partial harvests were rated neutrally, with about half of the sample viewing each one positively. Judgments of the clearcut and thinned units each differed significantly from those of all other treatments at the .05 level (Wilcoxon signed rank test). Mean ratings for the group selection and two-story treatments did not differ significantly.

Only the thinning remained in the generally acceptable range if employed in forests immediately adjacent to respondents' properties. About 15-25 percent fewer respondents found each harvest practice unacceptable when viewed from their own backyard. In all cases, mean acceptability ratings of practices in hypothetical backyard scenes were significantly lower than when the same practices were rated in an unspecified setting ($p < .05$, Mann-Whitney U test).

TABLE 15: Mean acceptability ratings for scenic quality of harvest practices in unspecified and simulated backyard settings

<u>Treatment</u>	UNSPECIFIED SETTING		BACKYARD SETTING	
	<u>Mean rating</u>	<u>Pct. acceptable</u>	<u>Mean rating</u>	<u>Pct. acceptable</u>
Thinning	2.6	97%	1.6	78%
Two-story	0.6	57%	-0.9	32%
Group selection	0.5	47%	-0.4	34%
Clearcut	-2.0	18%	-3.0	7%

TABLE 16: Summary of responses to willingness-to-pay questions

<u>Alternative to</u> <u>Clearcutting</u>	<u>Payment</u>	Positive		Negative	
		<u>N</u>	<u>Pct.</u>	<u>N</u>	<u>Pct.</u>
Original scene	\$350/yr	19	46%	22	54%
Thinning	\$190/yr	24	59%	17	41%
Two-story harvest	\$130/yr	21	49%	20	51%
Group selection	\$110/yr	20	51%	21	49%

TABLE 17: Reasons for refusals to pay for a scenic easement

<u>Reason</u>	Refused all offers		Refused some offers	
	<u>N</u>	<u>Pct.</u>	<u>N</u>	<u>Pct.</u>
Cost exceeds benefit of easement	13	56%	5	24%
Don't like alternative practice ^a	6	26%	9	43%
Unfair to have to pay for easement	3	13%	4	10%
Other or unknown ^b	1	4%	3	14%

^aReasons given for not liking a practice were safety concerns and unscentic appearance

^bIncludes persons who thought question was confusing or who gave no answer

Responses to the four willingness-to-pay questions showed that each offer was acceptable to roughly half of the homeowners (Table 16), with a slightly larger percentage willing to pay for a scenic easement that would allow commercial thinning but not final harvest. Respondents can be classified into three groups essentially equal in size: those who responded positively to all offers ($n=14$);, those who responded positively to one, two, or three offers ($n=13$); and those who responded negatively to all offers ($n=14$).

Respondents who refused an offer were asked why they wouldn't pay for the easement. These results are shown in Table 17. Among those who were unwilling to pay for any of the easements, the reason given most often was that an easement wasn't worth the price. The next most common reason was that a respondent didn't like the practice being offered as an alternative to clearcutting.

Those who rejected only some of the offers were less likely to base their rejections on the expense involved. For example, safety was the most common reason for refusing to pay for a two-story harvest. Concerns about possible wind damage to retained trees and snags apparently accentuated the difference in acceptability between backyard harvest and general forest harvest, as the decline in mean rating was 50% greater for two-story harvest than for any other treatment. Safety was not mentioned as a reason for rejecting easements that would allow thinning or patch cutting. Interestingly, one respondent refused to pay for an easement that would retain the unlogged condition on the grounds that a thinned stand would be preferable to an unmanaged forest.

To further examine the relationship between harvest impacts and the value of scenery, acceptability ratings of clearcuts and alternative practices were compared for persons who

were willing to pay for easements and those who were not (Table 18). Results suggested that the primary difference between accepters and rejecters was that the former found clearcutting less acceptable *wherever* it may be employed, not simply in their own backyards.

People who were willing to pay for each of the four easement options rated the clearcuts in unspecified settings significantly lower than those who would not pay. However, the two groups did not differ on the acceptability of the backyard clearcut nor of any of the substitute management options.¹¹ This suggests that willingness to pay to protect scenic quality is more closely aligned with a person's overall attitude toward forestry (and perhaps his or her environmental world view) than with a sense of enlightened self-interest. As such, it could be viewed as evidence of the transition noted by Freudenberg and Steinsapir (1991), who argue that NIMBY as an impetus for grassroots environmental protest is giving way to NIABY (not in *anyone's* backyard).

Assessment of image-capture technology

The pilot study was intended to test image-capture technology in two applications to forest management problems at the urban/forest interface. First, the method was used to measure differences in scenic impact of timber harvest methods when applied in a specific backyard setting rather than in an unspecified tract of forest. Second, the method was used to estimate willingness to pay for scenic easements that would provide varying degrees of protection from the scenic impacts of timber harvest. The results suggest that ICT was of

¹¹Accepters actually gave slightly lower ratings to all treatments, but the differences were statistically significant only for the clearcuts in unspecified settings.

TABLE 18: Comparison of acceptability ratings by persons who accepted and refused easement offers.

<u>Substitute treatment</u>	RATING OF CLEARCUT				RATING OF SUBSTITUTE			
	Accepters		Rejecters		Accepters		Rejecters	
	<u>Mean</u>	<u>N</u>	<u>Mean</u>	<u>N</u>	<u>Mean</u>	<u>N</u>	<u>Mean</u>	<u>N</u>
<i>Unspecified settings</i>								
Group selection	-2.7	20	-1.4	21	0.4	20	0.5	21
Two-story harvest	-2.5	21	-1.5	20	0.5	21	0.7	20
Thinning	-2.6	24	-1.2	17	2.5	24	2.7	17
Original scene	-2.6	19	-1.6	22	^a	19	^a	22
<i>Backyard settings</i>								
Group selection	-3.1	20	-2.9	21	-0.7	20	-0.2	21
Two-story harvest	-3.1	21	-2.8	20	-1.0	21	-0.7	20
Thinning	-3.2	24	-2.6	17	1.6	24	1.6	17
Original scene	-3.2	19	-2.8	22	^a	19	^a	22

^aRatings were not obtained for unlogged forests

value in both applications, assuming that the simulations were valid representations of likely scenic impacts.

Image quality was a potential concern in this study. The transition from slides to a computer and then back to slides led to a loss of photographic clarity. The slides that were rated as unspecified settings were also used as the basis for the simulated backyard scenes, but the former had greater clarity because they had not been subjected to the computer manipulation. If the loss of clarity had affected variables crucial to the perception of realism, the study results could be questioned.

As Perkins (1992) has warned, data visualization techniques may not be considered valid research tools until researchers know more about how image quality is related to perceived realism, and about how "good" image quality must be in order to adequately simulate a possible future condition. Both questions would affect the future potential of image capture technology for evaluating the appropriateness of ecosystem management.

So far the evidence looks promising. According to Bishop and Hull (1991), the resolution available from ICT is "generally adequate for simulation of most natural and urban landscapes." Bishop and Leahy (1989) found that, in order for simulated images to adequately replace photographs, they should (a) reproduce well the greenness level of the original scene; (b) contain a prominent cultural modification; (c) be confined to fore- and middle-ground; and (d) have low topographic relief. Conditions (b), (c), and (d) were incorporated into the study design -- the photos contained portions of respondents' own properties, and were near-view representations of stands on relatively flat ground. Adherence to condition (a) was not tested, but the fact that respondents were shown both

actual and simulated versions of the same treatment means they received all the information needed to "correct" for color inconsistencies between simulation and reality, if any existed.

A second practical problem in this study concerned the time needed to produce separate simulations for each household. Between 30 and 45 minutes of technician time was needed to prepare each simulation. As there were 152 simulations prepared -- four for each of 38 homesites -- construction of the simulations required between two and three weeks of work on a painstaking, detail-conscious chore. Variations in image quality could result from the gradual acquisition of skill and speed as the simulation process continued, as well as by human error associated with the tediousness of the task.

Results of the pilot study suggest that it may not be necessary to simulate each person's backyard, even when applying ICT at the urban/forest interface. Willingness to pay (a good indicator of environmental concern) appears to be a generalized response to harvest practices, not simply a NIMBY reaction. Therefore it should be enough to analyze homeowners' reactions to the alteration of prominent or valued local landscapes, without preparing large numbers of one-use-only simulations. Appropriate scenes for ICT manipulation can easily be identified by interviewing a few local residents.

The question of "how good is good enough" has an additional dimension when data visualization is applied to ecosystem management. ICT so far has been used in research primarily to measure reactions to existing visual stimuli that are superimposed on scenes of interest. For example, Orland *et al.* (1992) study that measured the value of street trees by obtaining real estate assessments of homes where images of real trees were superimposed on photos of treeless lots. But while there are examples of forest environments that we *think*

grew from conditions resembling those caused by New Perspectives silviculture, we've never actually observed succession in a New Perspectives stand. When ICT is applied to measuring changes in a stand condition over time -- rather than the simple cross-sectional example of the pilot study -- confidence in the simulation must necessarily be reduced.

Lynch and Twery (1992) raise two important issues regarding this problem: First, if we use photo-realistic simulations in planning and management, will the public hold us to them? It is unlikely that stands will look *exactly* as the simulations predict -- how do we communicate the probabilities associated with projecting a future condition that has never actually been observed? Second, future foresters will be held to future standards, which may not resemble our own. Multi-storied, uneven-aged, mixed-species forests may be preferred by today's public, but that doesn't mean the same preferences will hold in 2050. While there is evidence that aesthetic preferences have deep cultural or biological influences that persist across generations (Kaplan and Kaplan 1989), cognitive influences such as perceived risk may have changed by the time the first New Perspectives stands mature.

Such concerns notwithstanding, the pilot study clearly showed that data visualization techniques offer a new and powerful way to convey ideas about new practices and conditions such as those associated with ecosystem management. The technique not only was able to measure meaningful differences in responses to proposed practices and conditions, but it offers new opportunities for public participation in management. As technology improves and new modeling techniques are integrated with ICT, data visualization is likely to become a key element in applying the ecosystem management philosophy in day-to-day management.

6. Conclusions and Implications for Ecosystem Managers

There is little doubt that forest management can be both "ecologically sound and socially acceptable." Information gathered in this research project can help foresters and policy-makers understand how the practices and principles of ecosystem management affect the diverse set of values people attach to forests. It offers a means to recognize what "socially acceptable" forestry can be, and tools that can help in the task of creating that forestry. Some specific research products of the study are:

- The meaning of "acceptability" in a natural resource context was clarified. Eight propositions were developed which describe the nature of acceptability and the means by which it is assessed.
- A list of issues was compiled which describes how New Perspectives practices and conditions can affect a wide range of social values associated with forests, ranging from economics to aesthetics and from biology to spirituality.
- Differences in the reactions of various interest groups were analyzed, so that managers and policy-makers may be able to predict which impacts are likely to affect which publics.
- A promising new technology was pilot-tested which offers opportunities for managers to predict the site-specific impacts of an ecosystem management action.

This concluding chapter discusses the implications of the study findings in greater detail, and offers preliminary guidelines for the implementation of ecosystem management in a socially acceptable manner.

Dimensions of acceptability in ecosystem management

It is no longer enough for professional foresters to manage public lands however they think best. Realistic forest policies must be widely acceptable to a public whose members hold widely differing views on the use and value of natural resources. It may be easier to know what the public can accept if we understand how individuals or groups decide whether something is acceptable or not. A literature review yielded eight general propositions about acceptability. This section re-examines those propositions in terms of their implications for ecosystem management.

1. *Acceptability may apply to conditions, but it is a function of causes.* People try to discern meanings in their environments. Judgments about natural settings are based not only on what we see, but also on how it got that way, and why. A backcountry trail may be more acceptable if created by crosscut saw than by chain saw, and a quarter-acre expanse of bare ground in the woods may be more acceptable if it functions as a group campsite than as a log landing. Because ecosystem sustainability is a widely valued objective, New Perspectives silviculture is likely to be more acceptable than traditional practice among those who understand the objectives of non-traditional silviculture. However, no form of forest management is likely to be acceptable to those people who believe forestry itself reflects a misguided and ultimately dangerous desire to dominate and redesign natural landscapes.

2. *Conditions that arise as a result of "natural" causes are virtually always acceptable.* Natural consequences are accepted, if not always welcomed, by persons with both anthropocentric and biocentric world views. To adherents of traditional Christianity, natural events are of divine origin. In many "New Age" philosophies, nature itself is the

deity, so that all which is natural is godly (and thus eminently acceptable). Even in the secular language of the insurance industry, natural occurrences unattributable to humans or their artifacts are called "acts of God." We might expect, then, that the patch of bare ground in the previous paragraph would be even more socially acceptable than a group campsite if it functioned as an elk wallow.

The intrinsic acceptability of natural causes already influences natural resource policy. For example, wilderness managers can let fires of natural origin burn unchallenged, but must fight any fire of human origin even if the ecological consequences are likely to be identical. Ecosystem management itself is a reflection of the idea that nature knows best; the challenge for ecosystem managers is to convince a skeptical public that human manipulation which simulates nature is more acceptable than letting nature take its course.

3. *Acceptability of a condition is not an issue unless there are believed to be feasible alternatives to that condition.* This proposition is closely related to the previous one, because acts of God are, by definition, unpreventable. The 1964 Alaska earthquake had *undesirable* ecological consequences in terms of the loss of waterfowl nesting habitat in the Copper River delta. But those consequences are not *unacceptable*, because no one was given an opportunity to choose an alternative future. They just happened, and must be accepted.

Conditions that result from preventable but unforeseeable human consequences may be similarly exempt from acceptability judgments. For example, foresters now know that a century of fire suppression has had detrimental effects on forest health in eastern Oregon, but current forest conditions may not be unacceptable because previous generations of foresters could not have foreseen the consequences of their actions.

However, the consequences of an unavoidable natural event may be unacceptable if they could have been foreseen and prevented. Damage from wind storms is acknowledged to be a natural process in old growth stands, and is even incorporated into the design of ecosystem management practices in the Northwest. Such damage is acceptable. But windthrow alongside forest roads or recent harvest units is not, because the latter could have been avoided through careful timber sale layout or simply leaving the area untouched. And whether the damage is acceptable or not, a decision not to salvage the logs (as is likely under ecosystem management) may be acceptable to some publics but anathema to others.

4. *In the presence of feasible alternatives, acceptability is a function of the preferability, probability, and propriety of those alternatives.* What makes wind damage more acceptable in an old growth stand than in a managed forest is that in the latter instance, the evaluator has identified additional feasible alternatives. Existing conditions or practices are judged relative to those alternatives, taking into account one's preferences for different alternatives, the perceived likelihood that those alternatives could occur, and beliefs about one's right to demand alternative conditions. Someone who generally opposes timber harvest may find logging-related windthrow less acceptable in a public forest than a private forest, because the evaluator understands that a private forest is operated as a profit-generating business (and so the no-harvest option is highly unlikely), while the public has a right to protest harvest on government lands managed for multiple uses.

We can expect, then, that the social acceptability of ecosystem management will depend on how it is compared to other timber management options, including "silvicultural silence." New Perspectives approaches are often seen as a compromise between traditional

timber management and non-timber management. Public willingness to accept that compromise will depend on (1) personal preferences for other options; (2) beliefs about whether the most likely alternative to ecosystem management is more or less acceptable; and (3) beliefs about the right to demand and expect an alternative that one finds more acceptable than ecosystem management.

5. *Acceptability is a function of the perceived risk associated with a condition or practice.* Risk and uncertainty are inversely related to acceptability. Slovic (1987) has identified two dimensions of environmental risk: dread risk and unknown risk. Forestry generally ranks low on the first factor: Its risks are not usually fatal to humans, are catastrophic locally more often than globally, and tend to decrease with the passage of time. However, ecosystem management may rank high on the second factor, as evidenced by the fact that skeptics so often refer to the scientific uncertainties of New Perspectives. Due to the length of the forest life cycle, many years can pass between a decision and recognition of its consequences. We can guess how a New Perspectives stand will function in 50 years based on our knowledge of past natural disturbances. But we won't be certain for another half-century. The risks of an error in judgment are not entirely knowable, and may be delayed. Thus the consequences of error fall on those who had no hand in creating the condition, and no opportunity to prevent its occurrence.

6. *Acceptability depends on the local context.* No practice or condition will be acceptable in every place. Places can be special to individuals, groups, communities, or cultures; practices that change the condition of a special place are unlikely to be acceptable to those who hold it special -- even if the change produces conditions that are socially desirable

in a general sense. Thinning pine stands to reduce susceptibility to beetle attack may be generally acceptable, but thinning a certain pine stand might be unacceptable to someone who regularly visits that stand because its thick foliage offers refuge from nearby civilization.

The distribution of conditions within a specific landscape can also affect acceptability. On a visit to the Blue River Ranger District, a Wilderness Society lobbyist was asked what he thought about a New Perspectives harvest unit. He replied that while the practices he'd seen were a definite advance toward sustainable forestry, that particular watershed had already been so heavily cut over that he felt no further harvest should have been done there.

Because adaptation to local ecological conditions is a central tenet of ecosystem management, this form of forestry may be especially responsive to local social concerns. Ecosystem managers are already supposed to consider both the landscape context and the presence of critical habitat features. Questions about local acceptability will be resolvable as long as human landscapes and habitats are routinely included in the analysis.

7. *Acceptability is a function of social influences.* The social context affects acceptability just as the geographic context does. The first six propositions described influences on *individual* affective and cognitive responses to forest practices or conditions, but individual judgments are tempered by the judgments of others in one's reference group. A person may behave as though a practice were unacceptable, regardless of personal opinion, because to do so projects an image that will be viewed favorably by important others.

Elsewhere in this chapter it is argued that education about ecosystem management is a key to developing positive attitudes among individuals. While that is almost certainly true, it is also true that governments are more responsive to group positions than to individual

attitudes. Education can only go so far in changing attitudes at the scale of "*the public*." The political environment surrounding forestry is so polarized that any new initiative is likely to be viewed with suspicion -- i.e., as a ploy by the "other side" -- especially if it is seen as arising from the Forest Service rather than from a putatively neutral academic community.

8. "*Acceptability*" can refer to a pleasing condition, or a barely tolerable one. In practice, if not in theory, acceptability standards often define a tolerance threshold. Policies tend to find the lowest level of approval at which no one is unhappy enough to complain long, loud, and in public. While it is surely necessary for a multiple-mandate forest agency to satisfice, it may be too easy to do so by choosing a level of activity that the greatest number of people will endure. Such management may foster acceptance, but it cannot produce a *desired* future condition.

Some environmental activists believe ecosystem managers want only to find a level of timber harvest that reduces dissent to tolerable levels while adhering as closely as possible to the status quo. While that is not a primary objective of most scientists who are developing the new methods, the term "socially acceptable forestry" may tend to reinforce the misperception. Accordingly, environmental psychologist Paul Gobster (1992) has suggested that the concept of "appropriateness" be substituted for "acceptability":

"The concept of appropriateness ... ties aesthetics together with land ethics and stewardship in that it seeks a harmonious 'fit' or congruity between human activity and the natural world. This contrasts with the concept of acceptability, which seems more human-centered and implies the setting of standards of minimum adequacy, or limits to admissible, tolerable, or permissible change."

This simple change in wording is not a mere marketing ploy. An "ecologically and socially *appropriate* forestry" may prove easier for all sides of the forestry debate to accept.

Key issues surrounding ecosystem management

During the course of this study, participants in New Perspectives field tours and presentations raised issues concerning virtually every forest component as well as many aspects of human society. The 137 questions on pp. 49-57 cover subjects as varied as wetland ecology, worker safety, oxygen production, and the environmental awareness of minorities. It can be a daunting task to sift through such a list in search of the most important concerns. And in fact it may not be an especially useful task, since unsuspected "fringe" issues often form the greatest barrier to policy change and management actions.

Nevertheless, it is noteworthy that certain categories of concerns were mentioned repeatedly during the course of the study, while others arose infrequently or only in passing. Of 10 broad issue categories, six accounted for the most questions and comments during the study: (1) silviculture and regeneration at the stand level; (2) policy issues and political context; (3) planning at landscape and broader scales; (4) ecosystem processes and biological diversity; (5) timber yields and economic returns; and (6) scientific reliability and validity.

Reactions covering two of those categories -- landscape planning and ecosystem processes -- were generally positive. Landscape-scale issues were often difficult to explain and understand, but participants who grasped their significance almost invariably agreed that the multi-scale approach of ecosystem management is an improvement over approaches aimed exclusively at the stand level. Questions were directed at the "how" of landscape planning rather than the "why" (or "why not"). As long as such planning incorporates the values and preferences of private citizens as well as foresters, that aspect of ecosystem management may be unlikely to draw fire from the public.

Even stronger positive reactions were made to the biological aspects of ecosystem management. The basic objective of preserving biological diversity is almost universally accepted, although there may be wide disparity in motivations for doing so (i.e., an ethical imperative to maintain ecosystem integrity vs. a pragmatic desire to avert endangered species litigation). A few people don't see the need to maintain all species, and a few feel ecosystem management will do more harm than good. But the prevailing view of New Perspectives from an ecological standpoint is one of hope that it lives up to its considerable promise.

The remaining issues are ones that tended to garner more criticism than praise. Concerns about silviculture and scientific validity are intermingled. Many people who understand how forests develop seriously doubt that New Perspectives silviculture will perform as promised. Their doubts are reflected in their concerns about future growth and vitality in New Perspectives stands and in their critiques of the solidness of the scientific foundation for ecosystem management. They know that trees grow well using the traditional methods, and aren't convinced that the potential gains of ecosystem management can offset the potential loss of trees and timber. Some in the environmental community are equally skeptical, but unlike foresters they doubt that any sort of human intervention can work as well as unmolested nature.

Uncertainty casts a shadow on any new practice, and especially in forestry, where the risks may not be known for a generation or more. However, responses suggest that concerns can be eased if ecosystem managers are careful to make adaptive management a part of any proposal. If the public is convinced that monitoring is mandatory and reaction to problems is swift, perceptions of risk can be minimized.

Issues of economics were sure to arise, and they did. However, they were raised almost entirely by people whose jobs depend on timber harvest -- suggesting that others may believe in the ability of the Northwest economy to withstand any further disruptions that may arise because ecosystem management produces smaller timber yields. Public concern about economic impacts may be localized in places where timber harvest is especially important, and at times when other sectors of the economy are also suffering.

The political aspects of New Perspectives were perhaps the most dominant theme of the entire study. Will ecosystem management ease the pressures on agencies? Will it serve as a useful compromise between groups? How will different publics react to it? How will different publics be made a part of it? Many people characterized ecosystem management primarily in terms of its favorable position on a politically defined spectrum. Ironically, although the New Perspectives approach to forestry has its roots in the supposedly apolitical world of ecological research, its future may depend on its continued political attractiveness.

Two other issues warrant comment, though they evoked less interest during the course of the study. The first issue is aesthetics. Foresters often believe that non-foresters see the forest primarily as a scenic backdrop. Some worry that the "ugliness" of New Perspectives units -- which they see as a minor issue -- will make the practices unpalatable to the lay public. Previous research has found that aesthetics is overrated as a basis for environmental concern (Fortmann 1990); the current study likewise suggests that scenic quality is a minor issue to non-foresters as well as foresters. People readily admit it if they find ecosystem management ugly, but they'll generally live with the ugliness if it's for a good cause.

Moreover, the policy preferences of environmental activists may be rooted in "deep ecological" convictions that have little, if any, connection with the environmental preferences of the human species. Management that aims to produce the most scenic forest, or the best place for recreation, may be seen as misguided, irrelevant, or even dangerous by those who believe Mother Nature is the only qualified forest manager.

The second issue is safety. While this concern did not come up often, some people felt passionately that New Perspectives practices pose a serious threat to workers' lives, and were quite outspoken in their opposition to it. If several woods workers are indeed killed by snags or green trees or down wood retained in ecosystem management units, adverse reaction could be swift and volatile, and it could draw in segments of society such as urban organized labor which are otherwise rather indifferent to forest policy issues.

Finally, it is worth mentioning again that there are undoubtedly issues this study did not uncover. Reactions observed in the study may not reflect the full range of reactions to New Perspectives silviculture *even among those who participated in the tours*. For example, just because virtually no one mentioned the effects of ecosystem management on popular recreation activities, it doesn't necessarily mean no one cares about those issues. Rather it may simply reflect the fact that no representatives of recreation groups took part. Continued monitoring of public reactions should be part of any New Perspectives demonstration project, and innovative ways should be sought to sample the reactions of people who don't ordinarily participate in such activities.

Predicting acceptability among diverse publics

Results of the field tour study can be explained in terms of situated role theory (Stryker and Statham 1985, Jackson 1988), which bridges the gap between the structural role and symbolic-interactionist approaches to social psychology. This integrative view of social behavior suggests that people function in various social worlds which may persist for a lifetime but are entered only intermittently. In each of their social worlds, people present selves they believe others will accept, based on shared conceptions of the meaning of a given situation. As the social act progresses -- in this case, the act of participation in a New Perspectives field tour -- an individual will develop a "situated identity" and behave in ways that are consistent with that identity. People spend their lives moving from social world to social world, donning and shedding meanings and identities as they go.

This explains why the variable that best explained reactions to New Perspectives silviculture was the occupational/organizational role that led each person to take part in a tour. In essence, each person defined a self, then acted during the course of the tour in a way that was consistent with that self. A person who defined him- or herself as a "forestry professional (public agency)" tended to evaluate the demonstration sites in terms that were appropriate to that role, judging the responsiveness of New Perspectives silviculture to public opinion or the likelihood that adopting New Perspectives can reduce political pressure on agencies. Someone who took the role of "forestry professional (private company)" might have had the same education, work experience, and sympathy for environmental causes, but would evaluate New Perspectives in terms of its economic costs. Non-foresters tended to

evaluate the sites in political terms, because the political arena is the means by which they were most likely to influence the future of forests.

Four roles that were represented in the study defined significant elements in the social setting for ecosystem management: private timber firms and associated economic entities; environmental advocacy groups; public forest management agencies; and non-activist laypersons who are interested in forests and forestry issues. It is possible, based on the study responses, to predict how New Perspectives practices and conditions will be received among those subsets of "the public."

The four groups cover much of the spectrum of opinion about forest management and policy. At one end lies the timber industry, which stands the most to lose from any shift away from the timber primacy orientation that has prevailed on public forests in the Pacific Northwest. At the other end lies the so-called "environmental community," which includes groups or individuals advocating a radical restructuring of forest management priorities to preclude any extraction of timber resources from public lands. In "the middle" are the other two groups. They provide the base of support for New Perspectives, which they see as a more palatable alternative to both the business-as-usual approach of the timber industry, and the hands-off approach of some environmental activists.

For each group, there are aspects of New Perspectives that are liked more than others. Acceptability over the long term is likely to depend on how each group's concerns are addressed, as well as on the resolution of current uncertainties about the future development of New Perspectives stands and landscapes. Here are summarized some of the more important perceptions of ecosystem management within each group.

Private industrial foresters. The reactions of industry foresters are those of a group under fire. They believe in the principles of high-yield forestry. Their careers are built on the idea of an industry that uses tested scientific methods and the most modern technology to efficiently meet a nation's need for lumber and wood fiber. Ecosystem management is not -- nor is it intended to be -- an economically efficient means of timber production. And the loss of efficiency will be felt most heavily by those who earn their incomes through the harvesting and processing of timber.

Not surprisingly, then, industrial foresters can find much in New Perspectives that they don't like. Higher planning and harvesting costs, reduced timber yields at initial harvest and subsequent rotations, increased danger during logging operations -- these are overriding concerns. Industry employees also tend to be pessimists about the uncertainties associated with New Perspectives silviculture -- planting and regeneration difficulties, likelihood of disease and disturbance, effects of green-tree retention on genetic improvement programs. More so than other foresters, they believe in the sovereignty of technical expertise and resent the idea that lay persons untrained in "scientific forestry" should be given any real say about the silviculture of managed forests.

Nonetheless, even industrial foresters can find things they like about ecosystem management. The stewardship aspect of New Perspectives -- the preservation of every biotic component -- is no less appealing to this group than to any other. Many in the timber industry also see the public relations advantages of implementing ecosystem management, especially if done on a limited but highly visible fashion. When asked what they would

remember most about Plum Creek Timber Co.'s "new forestry" experiments near Enumclaw, Wash., five industry foresters wrote that it set a good example of corporate citizenship.

Two kinds of events could increase the acceptability of ecosystem management in private industry. As believers in the scientific-rational paradigm, industrial foresters should be no less convinced than anyone else by any research showing that the predicted silvicultural disaster will not occur. (Conversely, they will be quickest to point out silvicultural problems if they are shown to be a product of ecosystem management.) Acceptability is also likely to increase if the most likely alternative appears to be even less palatable. So far, the timber industry sees traditional high-yield forestry as an alternative which is not only proper and preferred, but also probable. If a New Perspectives approach is seen as the last best hope for maintaining any sort of timber harvest from public lands at all, we should not be surprised to see private industry heading the list of supporters.

Public forest managers. This group is largely supportive, although the cautions raised by Shepard (1990) certainly hold true. Public forest managers believe in the ill-defined tenet of "multiple use," and therefore see merit in the simultaneous management of forests for other values along with timber. If ecosystem management has the potential to improve the output of scenery, recreation, wildlife, or other social values, while also providing for some level of timber harvest, then agency foresters are likely to find it appealing. If it proves harmful to any of those values, agency foresters are just as likely to withdraw their support.

Longtime federal foresters believe they've been managing for multiple values all along. For them, ecosystem management may be simply a new and necessary permutation of multiple use which responds to shifts in the political winds. They're not unhappy with the

"old" forestry, and so they tend not to prefer New Perspectives practices over traditional silviculture. But they're enough attuned to the public to see a need for change, and are likely to hold positions that put them squarely in the path of any public protest. Public forest managers, more than any other interest group, bear the brunt of external pressures from all sides. It is no coincidence that ecosystem management is embraced by those public foresters who see it as a pressure valve.

Younger agency employees, especially those with non-timber responsibilities, may see ecosystem management as a vindication of their more biocentric approach to natural resource management. After all, most ecosystem management practices were developed by Forest Service scientists, and internal pressures had much to do with the agency's decision to adopt the New Perspectives philosophy.

Like their industry counterparts, agency foresters adhere to the scientific-rational paradigm. Ecosystem management, as it is currently conceived within the Forest Service, is a new sort of technical solution born of new scientific knowledge. Therefore support for the entire New Perspectives approach -- including public involvement and other non-silvicultural aspects -- may be quickly withdrawn if research shows the new practices have effects which are perceived as harmful to the overall "resource," which is still primarily seen as the large trees that dominate a forest.

Environmental activists. Environmentalists, like industrial foresters, find much in ecosystem management that they don't like. But their reasons are much different. They tend to be mistrustful of the New Perspectives initiative, perceiving it as an attempt by forest industries (and the forestry profession, which they may see as inseparable from industry) to

salvage something of a dying way of life. Thus they may define ecosystem management as a public relations exercise, or an excuse to enter roadless areas. Buoyed by recent political and legal victories, some of the more strident environmentalists may believe they are winning a crusade to protect the forests from the foresters. So while they prefer ecosystem management to the previous brand of forestry, they're not going to be ready to accept it as long as they believe they can win the battle outright.

Not all environmentalists feel that way, however. Those who assume a more centrist stance can be staunch allies of ecosystem management. Many members of environmental groups reported an educational background in forestry or biology, or said they "know quite a bit about forests and forestry." Responses from this group often reflected a belief that their knowledge about forest ecosystems should be given as much credence as that of scientists or working foresters. Therefore the public involvement aspects of ecosystem management may be crucial to its acceptability, which for this group will endure only as long as they believe their ideas can influence new policies and prescriptions.

Support among environmentalists is also highly contingent on perceptions of risk. One aspect of ecosystem management that activists found attractive was that it preserves more options for future forests. They liked the reasoning behind New Perspectives practices, but were unsure of foresters' ability to achieve their goals. If evidence suggests a continued decline in biological diversity despite ecosystem management, environmentalists are more likely to fall back on preservation proposals than to support new attempts to revise hands-on management strategies.

Interested, non-activist forest users. The non-affiliated persons who attended the tours represent a subset of the general public whose views about forest issues may have great relevance for public policy decisions. Some tour participants in this group were avid forest visitors, people whose favorite hobbies are likely to be hiking or nature study. Others (some of the biology students) spent little time in the woods, yet their responses did not reflect indifference as much as a detached interest in the fate of natural settings.

Responses from this group were almost indistinguishable from those of not-so-active environmental group members. They liked the sensitivity of ecosystem management to public values and its emphasis on biodiversity objectives. Unlike other groups, they rarely expressed doubt that the scientific establishment can achieve those objectives. This group, more than any other, saw New Perspectives as a viable pathway to achieve the "balance" between ecological and socioeconomic values that every politician claims to seek. As long as they understand what ecosystem management is trying to accomplish, and continue to believe in those objectives, this portion of the public is likely to accept the conditions it produces.

Contributions of data visualization technology

Unfamiliar forest practices will create unfamiliar forests. And like most other species, humans usually do not react positively to unfamiliar environments until they understand what those environments can (and can't) do for them. Given that the science and practice of ecosystem management can go more smoothly if political pressure is slight, it is prudent for environmental scientists and managers to familiarize the public with New Perspectives conditions. Data visualization techniques provide the means to do so.

In its most commonly available form, image-capture technology is simply a way to combine two pictures. An image depicting a proposed change is superimposed on a familiar image to produce a simulated environment, as in the McDonald Forest pilot study. Currently there are few actual New Perspectives stands to use as images of proposed change, leaving simulators with two options for approximating a more accurate image. In the pilot study, photos were sometimes used which were not entirely accurate in terms of slope, aspect, understory composition or age class distribution, because they were the best available. A second option is to painstakingly combine several photos or remove selected trees from an image in order to present the most likely post-harvest scenario.

For most educational applications, these techniques will be more than good enough, since the objective is to show what ecosystem management will look like in a general sense. However, in highly valued settings there may be problems later on if simulations offer an overly optimistic post-harvest scenario.

As ecosystem management is implemented and more photographs of New Perspectives sites become available, the ability to use this technology for site-specific simulation will be greatly improved. At the same time, however, newly developed technologies are likely to render the image-capture method obsolete. Already efforts are under way to combine photos with models of forest succession or growth and yield, as well as GIS (e.g., Host *et al.* 1992). It may soon be possible to take a stand or landscape for which site productivity and geophysical data are known, simulate a New Perspectives harvest, then "grow" the forest through the next rotation, producing realistic images at regular intervals to show a range of impacts on timber yields, soil stability, scenic quality, and more.

Guidelines for public education and demonstration

An often-repeated theme of this report has been that social acceptability can occur only if the public understands the objectives and potential impacts of ecosystem management. The importance of education became clear during Brunson's (1991) research on acceptability of New Perspectives stands for recreation and scenic viewing. To avoid researcher-induced bias during visits to the stands, respondents' questions about the study stands were deferred until after all sites were evaluated. Twice after community groups completed the survey, they asked questions about the reasoning behind New Perspectives silviculture. In both cases, respondents later said they would have rated the stands higher if they had known more about why the practices were being tested.

Research has shown that information can influence both cognitive and affective responses to forest scenes. Simpson *et al.* (1976) found that scenic beauty ratings were higher if respondents first read a Forest Service brochure citing the ecological benefits of thinning and slash piling in ponderosa pine stands, and also if they were told the alleged consensus of ratings by knowledgeable graduate students. Buhyoff *et al.* (1982) found that insect-damaged forests were rated less attractive if viewers were told first about the insect problem. Brunson (1991) found that when evaluators were given informational messages before judging slides of New Perspectives stands, they rated some scenes significantly more acceptable as scenery.

Attitudes about forestry practices are clearly linked to knowledge of forestry and forest biology. In a Maryland study, Becker (1983) discovered that opponents of clearcutting often did not know they had hiked through small, 5-year-old clearcuts to reach the interview

location, while supporters of clearcutting were more knowledgeable. Nelson *et al.* (1989) found that favorable attitudes toward clearcutting in Michigan were linked with beliefs that growth exceeds harvest in the state, and that clearcutting would create deer habitat. Manfredo *et al.* (1990) found a strong link between knowledge of fire ecology and favorable attitudes toward prescribed fire policies.

Yet the connections between belief and behavior components of attitude are elusive. Changes in attitude toward an object don't always seem to lead to behavioral changes (e.g., expressions of political support), and intervening variables such as the social context can produce behaviors that don't reflect expressed attitudes (Weigel 1983). Both the message and the behavior must be at the same level of specificity (Heberlein and Black 1976). In other words, a message about the biological importance of snags is unlikely to change attitudes about ecosystem management in general.

Participants in the field tours held highly positive post-tour attitudes toward the practical and philosophical aspects of New Perspectives. However, we know nothing about the "sustainability" of those attitudes. A single exposure to an attitude-change stimulus rarely results in a long-term change in attitudes (Cacciopo and Petty 1980), which is why television commercials are shown until regular viewers know every word and image by heart. Mass media methods may be neither available to ecosystem managers nor useful to them, given the simplicity of most such messages, but neither should managers pass up opportunities to reinforce information that an audience may have received previously.

Another of Brunson's (1991) findings was that acceptability of New Perspectives stands was higher when judged on-site than when judged from slides. There are two likely

reasons for this. On-site visits supplied more information, such as sounds and smells, that can influence acceptability. And actual visits lasted longer, giving people time to reconsider any initial negative impressions of what they were seeing.

Managers should consider the implications of those differences for education about ecosystem management, especially in situations where members of the public will get their first impressions of the new practices. Because negative impressions are more likely to come from photographs than from on-site visits, ecosystem managers should try to give as many people as possible a chance to actually see, hear, smell, and touch a New Perspectives demonstration stand. Open houses, tours, and other activities may be more useful than brochures or slide presentations at interest group meetings.

Such activities are labor-intensive, however, so agencies must also rely on interpretive signs and similar media for informing people when no manager is present. The location of such displays is important. Highly visible locations are more likely to attract persons who see the practices but don't take time to read interpretive information that accompanies it. The effect of driving past a New Perspectives stand at 55 mph is the same as the effect of seeing one for 5 seconds during a slide show, and reactions may be equally negative.

Persons whose initial encounter with a New Forestry partial cut occurs during a hike or a drive on a forest by-way may react more positively. They will have time to acquire more complete information about the stand and, as participants in a self-selected pastime, may tend to find the setting attractive simply because they chose to be there. But if the activity occurs in a preferred destination or "special place," a NIMBY-type reaction may occur. Managers should take care to avoid such places.

Strategic location of New Perspectives harvest units can also enhance their later use as recreation sites. Skid trails linking group selection units can become paths for horseback riding or mountain biking, or the units themselves can become campsites. During long-range planning of a network of recreational trails, the extremely high scenic quality of previously thinned stands can be exploited by locating thinning units in places where trail-building is not going to occur until late in the planning period.

Data visualization methods may make superior substitutes for on-site visits when it is not possible to bring people to actual ecosystem management locations. This is especially true if the audience can view a series of changes in appearance or, even better, are able to watch and offer suggestions as trained image-capture specialists manipulate scenes of interest. This technique is already being used in some locations where highways, housing projects, or similar projects are being considered (Chenoweth, pers. comm.).

Finally, it will be important for ecosystem managers to monitor public reactions to New Perspectives demonstrations. This is true because responsiveness to public values is one of the cornerstones of the ecosystem management philosophy (Robertson 1991), but also for the practical reason that managers need to know what aspects of their message is getting across, and which is not.

There are several ways to accomplish this, not the least of which are the methods used in this study. Informal surveys can be distributed at the end of open houses, tours, etc. These can include simple multiple-choice questions, but should also offer opportunities to make comments on issues managers may not have thought about. Another way to get useful qualitative information is to place employees or volunteers at interpretive sites, where they

can interview visitors about their reactions. These have the advantage of not running afoul of federal regulations governing surveys, but may require large manpower expenditures for data collection and analysis.

Audio and video recordings of educational efforts also make useful references, although they can be time-consuming to review, and may evoke suspicion among audiences not already well-disposed toward the managing agency. An innovative way to find out what catches people's attention on a New Perspectives demonstration tour is to hand out cheap disposable cameras at the start of the tour, collect and develop the film afterward, then (if possible) invite the photographers back later to distribute their photos and discuss what was found. Perhaps the simplest source of information is trailside registers, although such methods tend to yield mostly superficial comments.

A comprehensive monitoring strategy may incorporate all of these methods, plus constant impression-gathering by ecosystem managers during the course of their everyday duties. The key to the success of such a program will be not only to gather the information, but to regularly update the analyses and give them careful consideration during planning for New Perspectives activities.

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APPENDIX A: Description of Presentations Where Data were Gathered

Field tours where audience questions were content-analyzed

1. Western Forestry and Conservation Association

Audience: Professional foresters from industry, universities, agencies
Location: H.J. Andrews Experimental Forest and Blue River Ranger District, Willamette National Forest, Oregon.
Date: Sept. 5, 1990
No. participants: About 90 people
Presenters: Fred Swanson, Pacific Northwest Research Station, Corvallis
Miles Hemstrom, Willamette National Forest, Eugene
Jerry Franklin, Forest Resources, University of Washington
Lynn Burditt, Willamette National Forest, Blue River
Bill Atkinson, Forest Engineering, Oregon State University
Bill McComb, Forest Science, Oregon State University
George Stankey, Forest Resources, Oregon State University

2. American Forestry Association

Audience: Forest administrators, officials of national advocacy group
Location: Andrews Experimental Forest and Blue River Ranger District
Date: June 24, 1991
No. participants: 15 people
Presenters: Fred Swanson, Pacific Northwest Research Station, Corvallis
Lynn Burditt, Willamette National Forest, Blue River
John Cissel, Willamette National Forest, Blue River
Art McKee, Forest Science, Oregon State University

3. Oregon Native Plant Society

Audience: Botany hobbyists, schoolteachers
Location: Andrews Experimental Forest and Blue River Ranger District
Date: July 13, 1991
No. participants: 8 people
Presenters: Art McKee, Forest Science, Oregon State University

4. Oregon State University Sustainable Forestry Working Group

Audience: University faculty in liberal arts, natural science, and forestry
Location: Andrews Experimental Forest and Blue River Ranger District
Date: Aug. 29
No. participants: 21 people
Presenters: Fred Swanson, Pacific Northwest Research Station, Corvallis
Gordon Grant, Pacific Northwest Research Station, Corvallis
Mark Harmon, Forest Science, Oregon State University
Bill Denison, Botany, Oregon State University

5. Western Forestry and Conservation Association

Audience: Professional foresters from industry and public agencies
Location: Seattle city watershed (Cedar River drainage), and Kanasket unit, Plum Creek Timber Co., King County, Washington
Date: Sept. 12, 1991
No. participants: About 75 people
Presenters: Marc McCalmon, Seattle Water Department
Dwayne Paige, Seattle Water Department
Jim Arney, Mason Bruce & Girard, Portland
Jerry Bonagofsky, Wash. Dept. of Labor and Industry, Olympia
Dave Crooker, Plum Creek Timber Co., Seattle
Gary Johnson, Plum Creek Timber Co., Seattle
Kathy Snow, Olympic National Forest, Quinault, Wash.
Chad Oliver, University of Washington

Field tours where questionnaire responses were solicited

1. Oregon Native Plant Society (see #3 above)

2. Western Forestry and Conservation Association (see #5 above)

3. Linfield College biology students

Audience: Undergraduate students taking evolutionary biology course
Location: Andrews Experimental Forest and Blue River Ranger District
Date: Oct. 12, 1991
No. participants: 16 (14 questionnaires received)
Presenters: Art McKee, Forest Science, Oregon State University

4. OSU Experimental College Class ("Toward a New Forestry")

Audience: Enrollees in non-credit, community education class
Location: McDonald State Forest, Oregon
Date: Oct. 26, 1991
No. participants: 3 people
Presenters: Bill McComb, Forest Science, Oregon State University
John Tappeiner, Forest Resources, Oregon State University
Steve Pilkerton, Forest Engineering, Oregon State University
Chris Anderson, forest-adjacent homeowner, Corvallis
Mark Brunson, Forest Resources, Oregon State University

5. Eugene Group, Sierra Club

Audience: Members of environmental advocacy group
Location: Andrews Experimental Forest and Blue River Ranger District
Date: Oct. 27, 1991
No. participants: 8 people
Presenter: Art McKee, Forest Science, Oregon State University

6. Cascade Center Forum field trip

Audience: Persons who attended Cascade Center Forum (see #2 below)
Location: Andrews Experimental Forest and Blue River Ranger District
Date: May 17, 1992
No. participants: Unavailable (12 persons returned USFS questionnaire)
Presenters: Lynn Burditt, Willamette National Forest, Blue River
John Cissel, Willamette National Forest, Blue River
Mark Harmon, Forest Science, Oregon State University

Off-site presentations where audience questions were content-analyzed

1. OSU anthropology class (ANTH 481, Natural Resources and Community Values)

Audience: Undergraduate and graduate students in anthropology and various natural resource disciplines
Location: OSU campus
Date: Nov. 7, 1992
No. participants: About 30 students
Presenter: Mark Brunson, Forest Resources, Oregon State University

2. Forum sponsored by the Cascade Center for Ecosystem Management

Audience: Persons attending public forum sponsored by New Perspectives learning center (questions dominated by persons with natural science and environmental advocacy backgrounds)
Location: University of Oregon campus, Eugene
Date: April 25, 1992
No. participants: About 80 people (morning session), 50 people (afternoon)
Presenters: Fred Swanson, Pacific Northwest Research Station, Corvallis
David Perry, Forest Science, Oregon State University
Randy Molina, Forest Science, Oregon State University
Lynn Burditt, Willamette National Forest, Blue River
Andy Hansen, Forest Science, Oregon State University
Stan Gregory, Fisheries and Wildlife, Oregon State University
John Cissel, Willamette National Forest, Blue River
Tom Spies, Pacific Northwest Research Station, Corvallis
K. Norman Johnson, Forest Resources, Oregon State University
Karen Barnette, Willamette National Forest, Sweet Home
Hal Salwasser, USDA Forest Service, Washington, D.C.

3. DaVinci Days, Visual Cavalcade of Science and Technology

Audience: Community residents attending citywide summer festival
Location: OSU campus
Date: July 19, 1992
No. participants: Average about 20 people at any time during half-hour talk
Presenters: Mark Brunson, Forest Resources, Oregon State University

APPENDIX B: Field Tour Participant Survey

This survey was developed by the Consortium for the Social Values of Natural Resources to help us understand how visitors to Northwest forests react to the forestry practices and forest conditions they encounter. We're especially interested in new practices being developed and tested in the area you'll visit today. By answering the following questions during the course of this tour, you can assist our efforts to make forest management more responsive to needs, perceptions, and values of the public.

PART I: TO BE COMPLETED AT THE START OF THE TOUR

To put your reactions in their proper context, we need to know a little bit about you. The questions on this page can help us identify factors that might influence your perceptions of Northwest forests.

1. What is your hometown? (That is, when you meet someone new, what town are you most likely to identify as the place you call "home"? This might be your current residence, or someplace you've lived previously.)

CITY: _____ STATE _____

2. How often do you visit forests during your leisure time?

☐ Very frequently, at least once a week on average
☐ Somewhat frequently, at least once a month on average
☐ Occasionally, several times a year
☐ Rarely, no more than once or twice a year

3. Do you work in forests on a regular basis?

☐ No
☐ Yes (What is your occupation? _____)

4. Which category best describes the role that led you to take part in today's tour? (If you are retired, choose the role that best describes your pre-retirement career.)

<input type="checkbox"/> Forestry professional (public agency)	<input type="checkbox"/> Official of a governmental body
<input type="checkbox"/> Forestry professional (private firm)	<input type="checkbox"/> Member of pro-commodity advocacy group
<input type="checkbox"/> Scientist or forest researcher	<input type="checkbox"/> Member of environmental advocacy group
<input type="checkbox"/> Student	<input type="checkbox"/> Member of non-advocacy nature/outdoor group
<input type="checkbox"/> Other (please specify _____)	

5. Which category best describes your previous education about forests and forestry?

☐ I know very little about forests and forestry
☐ I know quite a bit about forests and forestry, but have little formal education in the subject
☐ I have taken one or more college courses in forest biology and/or forestry
☐ I have a bachelor's degree in forestry
☐ I have a bachelor's degree in biology (not forestry)
☐ I have an advanced degree in forestry
☐ I have an advanced degree in biology (not forestry)

6. Which category best describes your connection with any environmental advocacy group(s)?

☐ I have no affiliation with environmental advocacy groups, nor do I support any such groups
☐ I am not a member of any environmental advocacy group, but I sometimes support their positions
☐ I am a member of an environmental advocacy group, but am not especially active in it
☐ I am an active member of an environmental advocacy group

The questions on this page will help us understand your perceptions of forestry practices and forest conditions in the Northwest. For each of the statements below, please circle the number that best describes your agreement or disagreement:

1 = Strongly disagree

2 = Disagree

3 = Neither agree nor disagree

4 = Agree

5 = Strongly agree

- 1 2 3 4 5 Scenery should not be a major consideration in designing timber sales.
- 1 2 3 4 5 Some forest management activities can enhance the scenic beauty of an area.
- 1 2 3 4 5 Areas which have been logged will eventually return to their original condition.
- 1 2 3 4 5 Thinning a forest stand will usually increase its scenic beauty.
- 1 2 3 4 5 For some recreation activities, a logged area is a better place than an unlogged area.
- 1 2 3 4 5 Outside wilderness areas, timber is the most important resource on national forest lands.

What category best describes your present state of knowledge about the set of forestry practices that are generally known as "New Forestry" or "New Perspectives"?

- ☐ I know nothing at all about New Forestry (Please skip to Part II)
- ☐ I know a little about New Forestry
- ☐ I know a moderate amount about New Forestry
- ☐ I know a lot about New Forestry

The following viewpoints about New Forestry have been expressed in recent months. Please circle the answer that best describes how much you agree with each statement, using the same numerical scale as above.

- 1 2 3 4 5 New Forestry is to manage holistically, evaluating each activity as only part of the whole.
- 1 2 3 4 5 New Forestry is a jumble of trees, snags, and windfall -- a powder keg waiting for a spark.
- 1 2 3 4 5 New Forestry involves greater concern for integrating social values in management decisions.
- 1 2 3 4 5 New Forestry is a way to preserve the spotted owl while still allowing some timber harvest.
- 1 2 3 4 5 New Forestry increases emphasis on interrelationships among elements of forest ecosystems.
- 1 2 3 4 5 New Forestry will curtail timber supplies, eliminate jobs, and raise lumber prices.
- 1 2 3 4 5 New Forestry means maintaining a broader outlook on what forests can and should provide.
- 1 2 3 4 5 New Forestry is just sloppy clearcuts with theoretical benefits to wildlife.
- 1 2 3 4 5 New Forestry emphasizes the ecological appropriateness of forest management practices.
- 1 2 3 4 5 New Forestry is being used as an excuse to log the last roadless areas.
- 1 2 3 4 5 New Forestry is a way to manage for biodiversity in forests of any age.
- 1 2 3 4 5 New Forestry is an attempt to appease critics and lessen the sentiment against public forest management that has been generated by environmental activists.

PART II: TO BE COMPLETED DURING THE COURSE OF THE TOUR

We're interested in your on-the-spot reactions to the tour and to the sites you'll be visiting today. You have several pages like this one. One page is included for each stop on the tour.

Stop #__

1. The main topic(s) addressed at this stop: _____
2. What I will remember most about this stop was ...
3. I wish the speaker had said more about ...
4. My overall reaction to the forestry practices and forest conditions I saw at this stop was

<input type="checkbox"/> Very negative	<input type="checkbox"/> Very positive	<input type="checkbox"/> Neutral (neither positive nor negative)
<input type="checkbox"/> Negative	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative about some parts, positive about others
5. Why did you answer the previous question the way you did?

Is there anything else you want to tell us about this stop? Please feel free to use the space below in whatever way you see fit -- for sketching, jotting down thoughts or impressions, etc.

PART III: TO BE COMPLETED AT THE END OF THE TOUR

We'd like to ask just a few more questions that will help us understand your overall reaction to what you've seen and heard today. Thank you very much for contributing to our research.

1. As a result of today's tour, has your overall perception of forest management changed?
☐ No
☐ Yes, my perception is more positive than before
☐ Yes, my perception is more negative than before
2. How would you rate your overall attitude toward the New Forestry practices and conditions you saw today?
☐ Very negative ☐ Very positive ☐ Neutral (neither positive nor negative)
☐ Negative ☐ Positive ☐ Negative about some parts, positive about others
3. What aspect(s) of New Forestry do you like most? Why?
4. What aspect(s) of New Forestry do you like least? Why?
5. How would you compare New Forestry to traditional forest management?
☐ New Forestry is more appropriate for Northwest forests than the prevailing practices
☐ New Forestry is less appropriate for Northwest forests than the prevailing practices
☐ New Forestry and traditional practices are equally appropriate for Northwest forests
☐ New Forestry is better than traditional practices in some ways, but worse in others
☐ Not sure
6. How likely would you be to support using New Forestry practices on public lands?
☐ Very likely ☐ Very unlikely ☐ Not sure
☐ Somewhat likely ☐ Somewhat unlikely ☐ It depends on the location
7. How likely would you be to make a recreation visit to a place where you knew that New Forestry practices were used?
☐ Very likely ☐ Very unlikely ☐ Not sure
☐ Somewhat likely ☐ Somewhat unlikely ☐ It depends on the location

(To preserve anonymity, the remainder of this page will be torn off and kept separately.)

=====

If you'd be willing to take part in a follow-up mail survey, please complete the following:

Name _____

Address _____

City _____ State _____ ZIP _____

APPENDIX C: Summary of Questions Asked at Tours and Presentations

Western Forestry & Conservation Assn. -- Andrews/Blue River -- Sept. 5, 1990

- A. Following introductory remarks and old-growth ecology discussion at log-decay study site (Swanson, Franklin).
1. How much reusable nutrients are in the bole vs. in leaves and young stems?
 2. How do young and old-growth forests compare in terms of oxygen production?
 3. How much variation is there among old-growth forests in the Cascades (i.e., are there differences in the characteristics of old growth forests found in different drainages?)
 4. What are these plastic pipes for (apparatus for 200-year log study)?
- B. Following discussion of landscape-level issues at two-story stand (Swanson, Hemstrom)
1. How do you define "effective" old-growth habitat?
 2. Isn't edge supposed to be a desirable characteristic for wildlife?
 3. How large are the harvest units in the landscape-level planning exercise?
 4. What is the impact on timber yields of minimum-fragmentation strategies vs. the staggered-setting approach?
 5. If the pattern of cutting doesn't affect timber yields, how about the effects of leaving structure in the stand?
 6. How can you possibly choose among the enormous number of solutions that are available at the landscape level?
 7. Given the amount of scientific uncertainty that exists, wouldn't it make more sense to direct planning toward the first decade rather than decade 6?
 8. When you're planning at the landscape scale, do you link up plans across boundaries (e.g., planning jurisdictions, ranger districts, or forests)?
 9. Have you done any consultation with foresters in other countries who have done selective cutting, such as in Central Europe or Scandinavia?
 10. Can you include wilderness areas in your planning?

11. How does the public become involved in planning all of this?

C. Following presentation of dissenting view about New Forestry (Atkinson)

1. Why do you think that Congress, etc., are trying to prescribe timber management?
2. How much of a partial-cut stand do you think will remain (after exposure to wind- and snowstorms)?
3. Would interspersal of old-growth and younger stands make a forest healthier?

D. Following presentation on silvicultural considerations at two-story stand (Franklin)

1. What was your residual trees per acre?
2. What have you done in terms of reforestation?
3. How do you picture this stand 80 years down the road?
4. What is the effect of this (scattered green-tree retention) pattern on regrowth?
5. What were your costs here?
6. Can you anticipate doing intensive forest management, such as pre-commercial thinning or using genetically improved stock, underneath a residual canopy?
7. Are you looking at extended rotations on a majority of national forest areas, or only a few national forest areas?
8. Can we maintain yew habitat if we make openings like this?
9. Were there any snags or down logs in this stand, and if so, why wasn't it left here?
10. Have you looked at snags -- creating them or leaving a residual?
11. What kinds of pest management problems would you expect here, relative to what you'd expect in a plantation?

E. After description of sale history/harvest methods at Ennis #3 unit (Burditt)

1. What kind of vegetation control do you envision here?
2. Are you planning to harvest your new stand (at the end of the next rotation)?

3. What are your objectives for the residual overstory?
 4. What were your DBH limits for your leave trees?
 5. How did you identify the root rot pockets in this stand?
 6. What seedling survival do you expect here?
 7. What do you mean by "minimum-level management"? Does that mean no intensive forestry?
 8. Does that mean you'll be leaving this many snags and green trees on a typical Blue River district sale?
 9. What proportion of your leave trees do you anticipate being available for harvest at the next rotation?
 10. So you're saying that every acre of timber ground on the district will also be managed for wildlife?
 11. Do you foresee any problems with aerial fertilization?
 12. Does anyone do any follow-up studies on the effectiveness of your snag program?
 13. Why didn't you clump the snags instead of distributing them evenly throughout the stand?
 14. Will this address the visual concerns about traditional forest practices?
 15. How can this kind of thing reduce the concerns of congressmen about clearcutting (since it will look just like a clearcut from an airplane in the wintertime)?
 16. This looks like a fire waiting to happen -- can you address that?
- F. Following discussion of wildlife use of snags and coarse woody debris (McComb)
1. What species don't use riparian areas as corridors?
 2. Have you done any work on artificially enhancing wildlife habitat (e.g., nest boxes)?
 3. What about the reduction in the allowable cut -- have you factored that in?
 4. What effects might this sort of treatment have on game species such as deer?

5. What is the ecological importance of having "high" levels of a particular species, versus having "some" or "none"?
6. How confident are you of the snag modeling efforts?
7. How about the juxtaposition of old-growth and other stands (i.e., do your models take into account the fact that a harvest unit may be adjacent to an old-growth stand)?
8. Are you doing follow-up research and updating of your information?
9. Are woodpeckers an indicator species -- that is, can we know that these efforts will carry over to help other species?

G. Following elaboration of dissenting view and request for concerns (Atkinson)

1. How has the conservation community responded to New Forestry?
2. (Several comments) This kind of management is very costly. We can buy tracts of farmland in Lane County for less than it would cost per acre to leave these snags here.
3. (Comment) I can see great options for different ways of using New Forestry in second-growth forests. It won't be an all-or-nothing proposition.

H. Following description of Plum Creek Timber Co.'s recent New Forestry experiment (Halme)

1. What kind of changes have your field people had to make, in terms of the ways they think about harvesting a piece of ground?
2. Does it require a better-than-average contract logger (i.e., can only highly skilled workers perform these tasks)?
3. Is more sale administration work required during the harvest operation?
4. What kind of response are you getting from your shareholders?
5. How about the public response? Are you seeing public relations advantages?
6. So you've abandoned the scattered snag approach entirely (in favor of clumping)?
7. These leave trees, are they part of your timber base?
8. Do you "feather" the clumps at all?

I. Following discussion of social values associated with New Forestry (Stankey)

1. How do we get the media to understand and tell the truth about what's going on?

American Forestry Assn. -- Andrews/Blue River -- June 24, 1991

A. Following introductory remarks and old-growth presentation at log decay study site (Swanson, McKee)

1. Has anyone considered summer wood formation as a cause for the wide range of age estimates found in 400+-year-old Douglas-fir stands?
2. What is the expectation that this sort of basic study will lead to management applications?
3. DISCUSSION about the role of the public, and scientists, in shaping future forests. Incomplete information can have multiple effects on the way we manage. E.g., some may argue that it's imperative not to alter remaining old-growth until we know more about how they function, while others say it's imperative not to alter our high-yield approach to forestry until we have better data about potential alternative practices.
4. If we include New Forestry in legislation, won't it become institutionalized so that we couldn't abandon it when/if it's found scientifically unacceptable?
5. How can we ensure there's sufficient investment in monitoring New Forestry impacts?

B. Following discussion of aquatic/terrestrial interface (Swanson)

1. DISCUSSION about adaptive management. Institutional factors tend to encourage "cookbook" approaches that rely on meeting numerical objectives. Management agencies rarely have enough experts on staff who can make good judgments without a cookbook. There is a problem of confusing modeling with standards and guidelines.

C. Following discussion of stand-level issues at Slim Scout (Burditt, Swanson)

1. What is the value of sawlogs left behind in these units?
2. Could lump-sum sale contracts exacerbate the residual value problem -- i.e., will people end up paying for logs they've left behind?
3. Are these residual green trees going to be taken in 20 years, or are they lost forever?

4. How much additional sale administration cost does this approach entail?
 5. How much additional pre-sale preparation cost is there?
 6. How can we afford the waste of leaving sawlogs as woody debris? I think people want the logs to go to good use -- to the mill -- if they're dead?
 7. Why not do a series of four- to five-acre clearcuts instead of leaving these residual trees -- you'd have fewer administrative hassles?
 8. I'd rather see one big clearcut all along here, rather than a whole bunch of little ones.
 9. What are the costs to counties when these practices are used?
 10. When do the bidders pay -- up front?
 11. I think my membership would say we're just fighting over the scraps here. There's already been too much cutting in this drainage. The facts may say this is the way to go, but facts are facts and feelings are feelings. This *feels* like too much cutting.
 12. DISCUSSION over consumer costs, featuring disagreement about whether the public will "hit the ceiling" when New Forestry produces an increase in lumber prices, or whether prices can "raise quite a bit without a whole lot of squawking."
 13. Are there opportunities here for density management -- say, coming in here and doing some thinning removals in 80 years?
 14. You say this may turn into spotted owl habitat in as little as 70 years, but what's the point if you're going to cut it down in 80 years?
 15. Congress may see New Forestry primarily as a way to preserve the spotted owl. But if that's all it is, I don't think it gains us very much.
 16. What's the design of your [upcoming] research on long-term site productivity?
 17. Have you considered doing some productivity enhancement here?
- D. Following discussion of landscape-level issues at Slim Scout (Cissel, Burditt, Swanson)
1. DISCUSSION about the value of maps and GIS as a public participation tool for landscape-level issues. It's useful, but an expensive tool.
 2. Is it possible to do a GIS overlay on risk assessment (evaluating insect susceptibility, *Phellinus* pockets, etc.)?

3. What happens to your tree improvement program? Is it compatible with New Forestry?
4. Will you plant under these stands, or use natural regeneration?
5. Can pre-commercial thinning be used here to promote biodiversity (e.g., through varying within-stand clumpiness)?
6. Has there been any research on the effect of leaving coarse woody debris on animal damage to seedlings?
7. Have there been any blowdown problems in these stands?
8. What are the implications of this for international trade? Will we all be using New Zealand *Radiata* pine and Brazilian eucalypts for structural timber, and managing these forests for some other specialty products -- or a different use altogether?
9. Are there any long-rotation management areas on the Willamette National Forest?

Oregon Native Plant Society -- Andrews/Blue River -- July 13, 1991

A. Following final tour stop at Slim Scout (McKee)

1. How has the rate of cutting in this area changed over the past 35 years?
2. How much will this reduce future yields?
3. Why do you log at all on such steep slopes?
4. This is definitely better than clearcutting. Double the number of green trees, and you'll have it!
5. Who's going to be able to log sites like these -- does it take a special logger?
6. I agree with Jerry Franklin that you should be doing this everywhere instead of clearcutting. This is a good compromise.

A. Following presentation at Slim Scout (Swanson, Grant)

1. Do you get a lot of blowdown in these stands?
2. It's been suggested that this is a compromise [between clearcutting and no cutting], but there are other techniques that fall between this and no harvest -- so won't some people see this as *not* any kind of compromise?
3. When will this be reforested?
4. If we think about this on the landscape scale, we need a diversity of practices from clearcutting to preservation. For example, productivity is site-specific. We don't need large woody debris at every site. Evidence and intuition tells us we can sustain productivity in some places without it.
5. Is our state of knowledge good enough to make prescriptions for a mosaic of productivities?
6. Do you have simulations of these stands that can help you make predictions along different trajectories? It seems like a useful question to consider what happens if we reconstruct these into the past as well as into the future.
7. DISCUSSION about the potential for adaptive management. New Forestry may be applied in a way that is too prescriptive -- for example, leaving 8 trees/ac. for snag recruitment on every acre here -- because the Forest Service doesn't have people who really know the land they manage. A *Waldmeister* approach may be preferable, but there are intra-agency pressures to discourage that.
8. I'd like to see some work done on a big-basin scale -- say, the McKenzie versus the South Santiam.

B. Following presentation at canopy lichen study site (Denison)

1. What's the dispersion rate of the *Lobaria* propagule?
2. What other sources of nitrogen are available to old-growth forests?
3. It seems that if we don't allow regenerated stands to go through a 30-year period of alder domination, there may not be enough nitrogen capital to support an old-growth system. Doesn't it seem, then, that we're mining the old-growth resource?

4. DISCUSSION about potential economic uses for alder: sawdust substrate for shiitake mushrooms, purchase by Davidson Industries at \$20/ton.
 5. What about Europe -- have we learned anything from their experience?
- C. Following presentation at log decay study site (Harmon)
1. Have you identified any new species of insect or fungus?
 2. Do New Perspectives silvicultural prescriptions require leaving enough down woody material?
 3. Have any log decay studies been done at Mount St. Helens?

Western Forestry & Conservation Assn. -- Cedar River/Plum Creek -- Sept. 12, 1991

- A. Following presentation at mature forest site (McCalmon, Paige)
1. Do you assume you have all kinds of species everywhere, or do you do some kind of diversity survey before harvest?
 2. What percentage of the watershed is in old growth?
 3. What is the landscape scale you're working with on the city watershed?
 4. Will your wildlife surveys be detailed enough to allow monitoring of species response?
 5. Could you lock up the entire watershed and still meet your water needs, or do you need to "do things" to ensure adequate streamflows?
 6. Do you have a hydrologist on staff? [Answer was no -- a spirited discussion ensued.]
 7. What percentage of your watershed is in clearcut area?
 8. How many acres are you logging?
 9. What is the Seattle Water Department's objective for biodiversity?
 10. What is your objective for water quality control?

11. This stand hasn't been managed for biodiversity, yet you're using it as an example of a diverse forest. Could you comment on that?
 12. How do you know when you achieve an acceptable level of biodiversity?
 13. Is anything being done to measure the economic and social effects of changing your practices?
 14. What was the change between the 1970s level of cutting and your current level?
- B. Following discussion of stand-level practices (scattered snag retention) and growth/yield modeling (Paige, McCalmon, Arney)
1. What's your silvicultural prescription here?
 2. Are you doing any site preparation?
 3. Did you do any vegetation sampling beforehand?
 4. These remaining trees -- do you see these as snags as well as large green trees?
 5. Is this an area where you could create old growth?
 6. What volume per acre did you leave and retain?
 7. If this were clumped instead of using a scattered retention approach, what would it look like?
 8. What is your mandate for reforestation in the watershed?
 9. How did the fallers adapt to a new system like this?
 10. What size of equipment are you using here?
 11. How much impact was there on piece size -- did you have to buck smaller?
 12. How many passes do you make on each shovel road?
 13. As an operator, how would you feel about leaving more snags and culls?
 14. Did you prescribe for logs out there on the ground? If so, was it merchantable stuff?
 15. Could some additional planning have been done to facilitate your shovel operation?

16. What percentage of predicted reduction in volume is due to shading, and how much to overstory canopy loss?
17. Are you assuming all your regeneration is going to survive?
18. What effect does moving toward establishment of a mixed stand have on timber yield?
19. How can you do this sort of modeling, given the level of uncertainty in your underlying assumptions?
20. How do we calculate sustainability to the public's satisfaction if we don't have any data?
21. Why are trees less windfirm in western Washington than in western Montana?

C. Following discussion at aggregated snag stand (McCalmon, Snow)

1. What's your long-term intent for these leave strips?
2. What's your experience with deer browsing on western redcedar?
3. Do you see any difference in windthrow depending on the type of trees chosen for retention?
4. Has there been any use of snags by wildlife?
5. Can you do any harvest (on Forest Service land) without leaving any trees?
6. What is your longterm objective for the residual?
7. Can some of the non-merchantable material left at landings be used to fulfill coarse woody debris requirements?
8. What's the 50-11-40 rule?
9. How do you track coarse woody debris and residual snags in your stand inventories?
10. DISCUSSION about the agency-public interaction and the relative importance of foresters helping the public learn about forests versus foresters learning more about public expectations.
11. Are you working with researchers in your New Perspectives harvests on the Olympic National Forest?

D. Following discussion at Plum Creek's Enumclaw "ecological forestry" unit (Crooker, Johnson, Bonagofsky, Oliver)

1. How much blowdown have you had here?
2. Why would you choose scattered snags versus clumps?
3. Do you have any information on wildlife response?
4. What has been your public response?
5. What is the proposed silvicultural prescription here?
6. Have you done any calculations of the impact on annual harvest?
7. Is Plum Creek doing anything in terms of basic public education about industrial forestry?
8. What kinds of herbicide application methods have you used? Are there any contractors here who do machine-mounted spraying?
9. What attempts have you made to incorporate coarse woody debris into your prescriptions?
10. What percentage of the land where you're doing this experimentation is suitable for ground-based systems, and what percentage is cable ground?
11. Does this make you more efficient on a cunit basis?
12. Is the Washington Department of Labor and Industry monitoring accident rates for traditional harvests versus New Forestry?
13. How about differences between falling old growth versus second growth?
14. What are the liability implications of this kind of harvest?
15. Is the federal government liable for incidents on its lands?
16. Are there any rules of thumb on safe snags to mark, with respect to differing degrees of rot?
17. Can you define what you're calling the "snag hazard area"?
18. What about snag creation from a safety angle?

19. What is meant by "desired future condition"?
20. How can we know what the appropriate targets are?

Anthropology 481 class -- Oregon State University -- Nov. 7, 1991

1. Will the acreage which is available for harvest be expanded to compensate for the reduced volume per acre, in order to maintain a constant flow of timber?
2. It seems to me that [retaining] 10 trees per acre isn't enough.
3. What will the reduction of a forest to snags do to fog capture in the stand?
4. What about other microclimate effects -- albedo, brightness, temperature? Will these stands perform the wildlife habitat functions they're purported to perform?
5. What is the danger of windfall?
6. What would happen if you varied the shapes of the logged areas, or the way snags and live trees are distributed in the stands?
7. How about logging safety -- isn't scattering snags more dangerous?
8. Are you going to try this in eastern Oregon, too?
9. To me it's important to walk around in a stand of trees and know that it's 300 years old, not just created to have old growth-like features in it.
10. This whole discussion about new forestry is really avoiding the issue: If 80 percent of the Northwest's old growth is already gone, how can you want to cut it any more?
11. Is it ethically or politically proper to "hide" the reality of timber harvest? Wouldn't people conserve wood better if they understood the aesthetic consequences?
(Discussion ensued in which various people debated whether the Forest Service's duty should be to provide scenery because people want it, or to take whatever actions are likely to promote good stewardship even if it means making forestry look uglier.)

A. Following presentations on stand-level issues (Perry, Molina, Burditt)

1. Can you explain further about how hardwoods protect conifer forests? Don't hardwoods also maintain proper pH?
2. Is planning in New Perspectives units done on a watershed basis?
3. Do you look at the effects of roading in your planning units?
4. Is the Forest Service studying the role of old growth as a reservoir for parasites that control phytophagous pests?
5. Given the current political/economic climate, how likely is it that the new knowledge will be given a role in political solutions?
6. Is anyone studying the microclimate effects of these practices? How might changes in microclimate -- for example, temperature -- affect the residual trees and also fungi and micro-organisms?

B. Following presentations on landscape-level issues (Hansen, Gregory, Cissel)

1. You said we can't maintain ecological healthy simply by taking a hands-off approach. Why not?
2. Isn't fragmentation and the disruption of natural dispersal patterns a more important contributor to species loss than the decline in early seral stage habitat? Also, doesn't fragmentation destroy the natural fire regime?
3. Will this influence [the Willamette National Forest's] decision whether or not to salvage-log Warner Creek?
4. How far back are you going in your fire history stuff?
5. How do humans and horses in wilderness affect streams and wildlife? Do we know enough to incorporate wildlife concerns into wilderness management?
6. What are the effects of leaving buffer strips on stream ecosystems?
7. How can you say that the Eugene metropolitan area has an effect on streams 100 miles away?

C. Following presentations on regional/national issues (Spies, N. Johnson, Barnette)

1. Is the Clackamas Ranger District's model of public "focus group" involvement being used elsewhere?
2. Where does the human species fit in scientific risk analysis such as was done in the Gang of Four process?
3. Where do non-timber commodities like mushrooms and taxol fit into your planning?
4. Have the regional GIS analyses looked at the non-federal lands between Eugene and Roseburg?
5. How would you go about developing a new charter for the Forest Service [as suggested by Norm Johnson]?
6. How can we get independent science assessments and incorporate them into management when science isn't value-free?
7. Isn't a loss of biodiversity ultimately going to lead to a loss of timber productivity -- which means that timber and other ecosystem components aren't tradeoffs, but rather complements?

D. Following keynote address on "Integrating People's Needs with a Sustainable Landscape" (Salwasser)

1. What's the funding for New Perspectives projects, and how does that relate to the national forest management budget?
2. It seems to me that the key question is integration between research and management. It seems that the politics, rather than the possibilities, define the scientific bounds.
3. If there were materials other than wood which could be substituted without higher energy costs, would the Forest Service support it?
4. What's the role of the layman in forums where scientists are in charge, since scientists don't pay attention to lay knowledge?
5. Can trees other than Douglas-fir be developed for fiber and construction materials?
6. How do we get the public sector back into doing very basic biological research?
7. COMMENT: To us, New Perspectives is really just New Propaganda.

DaVinci Days -- Corvallis -- July 19, 1992

1. Do we know enough about nutrient retention and long-term site productivity to know if we're leaving enough coarse woody debris in the stand?
2. What are your plans to do this sort of management in eastern Oregon?
3. How does prescribed fire, like they're talking about doing on the east side, fit into new forestry"?

APPENDIX D: Interviews of recreation participants

Interview 1: Sunday, May 24, mid-morning

Man and woman in their late 30s, on horseback, encountered on the 600 Road in McDonald State Forest where a skid trail enters the Lewisburg Saddle replication of the College of Forestry Integrated Research Project (CFIRP). The interviewees live along Soap Creek near Tampico Road and regularly ride in McDonald forest. The woman did almost all of the talking. She said they frequently ride through the CFIRP site along the network of new skid trails, and were glad that the area had been logged for two reasons. First, the new skid trails "turned a 12-mile into a six-mile ride, because we don't have to follow the road all the way around." Second, the area isn't attractive to hikers. The woman said she has taken part in the forest's trails planning process and sees horse riders as a "pressured minority" whom hikers would like to eliminate from the forest. As a result, she said, she and her friends routinely seek out new trail opportunities. ("If they're there, we find out about 'em pretty quickly.") She said many riders regularly carry clippers to maintain trails like this one if the forest management doesn't do so.

Asked if the timber harvest affected her experience in any way other than providing a new trail to ride, both riders said they didn't mind seeing a logged area. However, the woman said she wished there was information posted somewhere explaining what was going on "at the other end of the trail" (i.e., the two-story stand), because she'd always been curious what the point of the experiment was. She also asked when they were going to get around to logging "right up here" (in the group selection stand) -- not realizing that the patch cut area had had any deliberate harvesting other than along the skid trails.

Interview 2: Sunday, May 24, late morning

Woman in her 30s, on horseback, encountered on the new road just off Sulphur Springs Road separating the two-story stand and clearcut with snags. Interviewee grew up in the Soap Creek area and was visiting relatives. She had borrowed a horse for a short ride into McDonald Forest. She said she had ridden in McDonald and Dunn forests as a child, and was surprised at all of the changes in vegetation. Asked to elaborate, she remarked on the size of the trees (bigger than she remembered), particularly at the top of Lewisburg Saddle where there had been considerable blowdown during the 1962 Columbus Day storm. She also remarked on the large clearcut across Sulphur Springs Road from the CFIRP unit. Asked if the logging affected her recreation experience, she said she didn't mind the CFIRP (ecosystem management) units nearly so much as the large clearcut, especially from down in the valley at her folks' house. She also remarked on how it seemed that there was a lot more logging going on in the Corvallis area now than when she was a child, and she supposed if she lived here still she'd be more used to it.

Interview 3: July 31, 1992, evening

Married couple in the late 40s or early 50s, walking their dog on the 510 road near the Peavy Arboretum replication of CFIRP. The interviewees live on McDonald Circle immediately adjacent to the research site. For several years they have walked 2-3 times per week on nearby McDonald Forest roads and trails, except during the time when access was limited due to the CFIRP timber harvest. They said they had been opposed to the harvest when it happened, "but not as much as some folks." As soon as the logging was finished they began using the site again, partly because it is convenient and partly out of curiosity. They said they would have preferred that the area had not been logged, but now that they've had a chance to get somewhat used to it, they "don't mind it so much. It's nice up here in the spring, because you get more sun now even in the evening." They're concerned, however, about the potential for future logging that might look worse or affect their property values, and they weren't especially impressed by the willingness of the forest's management team to consult with neighbors before beginning harvest.